Phi Delta Kappan

A JOURNAL FOR THE PROMOTION OF RESEARCH, SERVICE, AND LEADERSHIP IN EDUCATION

VOLUME XXXV NUMBER 1

October, 1953

Educational Research: A New View

THE PHI DELTA KAPPAN

Journal of Phi Delta Kappa, Professional Fraternity for Men in Education

For the promotion and improvement of free public education through a continuing interpretation of the ideals of research, service, and leadership

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Entered as second-class matter at the post office at Fulton, Missouri, under the Act of August 24, 1912. Φ Published monthly, October to June, inclusive, by Phi Delta Kappa, Inc., at 1201-5 Bluff Street, Fulton, Missouri. Acceptance for mailing at a special rate of postage is provided for in the Act of February 28, 1925. Φ Subscription rate, $4.00 per year. Single copies, while available, 50 cents each, from the Homewood office. Φ Official statements of Phi Delta Kappa are so indicated. Other statements and articles are published as expressions of the personal views of the writers. Φ Listed in *Education Index*, published by the H. W. Wilson Company, New York, N. Y. Φ EDITORIAL OFFICE: Phi Delta Kappa, 2034 Ridge Road, Homewood, Illinois. Address all communications, purchase orders, and address changes to the *Business Manager*, PHI DELTA KAPPAN, 2034 Ridge Road, Homewood, Illinois. Φ Member, Educational Press Association of America.

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Introducing Mistress Caledonia

WHAT VEIN of conceit, what blaze[1] of vanity, what streak of perversity is it, that causes printers, editors, and other typographic enthusiasts to consider the creation of a new magazine "dress" of such importance as to justify using valuable space to announce it?

Since order is the basic creed of beauty, who would change? Nature, the great teacher and exponent of art, dotes on *system*. Balance, proportion, arrangement, harmony, form, symmetry, peloria, eurythmic—the rich vocabulary itself suggests the supremacy, the magnificent abundance of this fundamental quality in Nature's masterpieces. Yes, nature is devoted to the principle of *order*. Yet it is through departure from strict order that progress is made. As geneticists know and sometimes tell us, it is change, mutation, that carries nature, *and* beauty, on to new heights. The random fleck of color seen for the first time in the throat of a new gladioli, a first faint rubescence on an alabaster rose—these give life new interest and compel new attention by a different and arresting accent.

The format of PHI DELTA KAPPAN has long been orderly—in one of its best typographic manifestations. Foolhardy indeed is he who would change it without sufficient cause and without due consideration. We have had the temerity, however (under the gentle lash of the Board of Editorial Consultants), to change it, to "gild the lily," as it were. We shall preserve the basic order—indeed, we are steeped in the same tradition. But we hope, also, to employ the occasional emphasis, the timely stress, the fillip which will command attention and interest.

The above is but to introduce our new mistress, Caledonia by name. After many years, our good friend, Garamond the Faithful, has been dismissed, and Caledonia reigns instead. This linotype face, the creation of one of America's greatest graphic artists, is relatively new, fresh and a bit bold—bolder, at least than Garamond.

The change was dictated by a decision to use a smoother finish paper (English Finish, to be technical) which will permit half-tone illustration throughout the body pages. Garamond was judged too light a face, too pale, for the new surface and so a boldish minx, Mistress Caledonia was summoned. And, to make the metamorphosis complete, Caledonia's companion, Caledonia Bold was called on for all display lines except main heads. There, her cousin, Bodoni Modern leads the way. These, with a dash of heavier rules here and there, for balance, complete the dynasty—and we begin a servitude of unknown duration (tastes are fickle, you know).

Oh, yes. Our cover! It, too, has been given a face-lifting. It, too, has a fleck or two, lending both a lilt and a grace to a strong KAPPAN. Perhaps our *dour* (we *are* pulling your leg a bit) schoolmasters will not like it, but we hope for the best.—L. A. (See page 28 for details.)

[1] Blaze—a stripe, as on a horse's head. See blaze-faced, blazed, blazy, etc. Also used as a proper name, as Blazer.

The Way of Science—Slow and Tedious

SCIENCE always suffers in an era of impatience. Planning takes the place of science. New deals and new pronouncements flourish. The slow progress of science seems too conservative. To build only as far as our knowledge permits is not in accord with the ambitions of the present age. We must go beyond science.

"In the fields of education the lines of conflict between two sharply opposing schools of thought are drawing tighter. The one school holds that the better social order, which all desire, will be reached by following grand philosophies formulated in the minds of our Prophets; by accepting *a priori* plans and formulas hastily put together. The other school, with the same idealistic goal as its objective, has an utter distrust of all new plans, new deals, and new formulas which are spun out of the desires of wishful thinkers. This school holds that when practices get too far ahead of knowledge the inevitable error in direction makes necessary a long period of reconstruction while the erroneous ways are being forgotten; and that, in the long run, the slower progress which is necessary if

we seek the truth as we go, will bring mankind more surely to its final goal and with less suffering enroute.

"Past educational practices afford many illustrations of the effect of these two opposing schools of thought. We were told in phrases that sounded well that the elementary school was the period for memorization and drill, that reasoning and problem solving were not in order until after the age of adolescence. Scientific studies of the growth of mental abilities, such as those made by Thorndike and others, eventually dislodged the basis of this *a priori* theory and elementary schools profited immensely. Persons who posed as authorities in the field of education decided subjectively what the curriculum in spelling should be and made a curriculum corresponding to their notions. Scientific studies made by Ayres, Horn, and others have completely discredited these *a priori* views as to what words children should spell and again the school has profited enormously. High sounding phrases to the effect that all men are created free and equal were translated by educational reformers into school practices which treated all children as though they could master the same course of study and learn by uniform methods of teaching. Scientific investigations of individual differences finally convinced the schools that a uniform program is impossible and that adjustments to individual needs are necessary. Example after example could be given to show that educational planning which does not rest upon scientific data produces an inevitable error in direction and a corresponding waste of energy.

"The scientific movement in the field of education during the last thirty years has produced an entirely new type of literature. School teachers and administrators have a body of factual data on which to build practices which was almost completely lacking thirty years ago. A good beginning has been made, scarcely more than that. In contrast with the development in education through all the years when wishful thinkers have propounded their reforms, the progress of the past thirty years needs no defense. Yet, because the way of science is slow and tedious, impatient reformers now demand that we renounce it as a method, that we create a school for the new social order out of whole cloth, that creation rather than scientific achievement is now the order of the day.

"The open discussion of these views in the educational press is stimulating and obviously useful, but . . . in view of the advances in educational practice which even a short thirty years of scientific research have made possible, it seems unthinkable that educational leaders will now (or ever) turn back to speculation and authority. Yet, with science gone, what else remains?

"The time for scientific contributions to education was never so opportune as now. The age of easy expansion in education is over. The time for critical research is here. We have witnessed in successive waves popular interest in achievement tests, mental tests, new type examinations, ability grouping, curriculum revision, project and activity movements, and administrative schemes without number. Popular exploitation of these is past. Real scientific achievement is now possible.

"Phi Delta Kappans have pledged allegiance to an ideal of research. Never was there more need of a clear, unemotional understanding of the place of fundamental research in the field of education than at the present time. Between the wishful thinkers and the ultra-conservatives there is a third party—the progressive realists. This

(Concluded on page 24)

Educational Research: A New View

By THE PHI DELTA KAPPA COMMISSION ON RESEARCH

RESEARCH is a magical word. It speaks of new things, new plants for food and beauty, new machines that perform fantastic tasks of transportation, increased production of material goods, and tremendous multiplication of human power. It reveals new chemicals to combat harmful microbes and other enemies of man. It creates new developments in the production, supply, and distribution of foodstuffs, shelter, clothing, and the varied comforts and luxuries of man. Moreover, research gives new knowledge about man's relations to man and to the universe. Research is something that is found everywhere—on the farm, in the factory, on the

highway, in the home, and in the school. What then is it?

Research is a search for truth, for new knowledge It is an intellectual process as ancient as man, changing in purpose and form and currently described as a science. No area of living has a monopoly on it, although some areas have developed more dramatic results than others. This is especially true in the physical sciences. However, research in the humanities and social sciences has produced much new knowledge about man himself.

To consider the various challenges of research in education one has only to think of the unparalleled development of public education in the American culture within the last half century. Who would question the value of education in producing the material things of life? Or the influence that it has had in shaping the nature of our society? Who doubts that man is now on a new threshold of living with fantastic machines for transportation, production, and distribution of material goods; with push-button warfare; with an increasing degree of mechanization for production of material goods; with a great potential release of manpower, and a consequent need for finding creative jobs for men? All of this means a staggering challenge for education to help adapt these changes to good uses for surely, just as education has in the past helped shape the nature of our society, it will continue to do so in the future.

Education, like other areas of life, has utilized research. Volumes would be required to describe the new knowledge that has been added, or the new methods that have been developed for pursuing new knowledge, during the last half century. Moreover, volumes would be required to speculate on the impending challenges to education and the need for continuous search for new knowledge to meet those challenges in the future.

In spite of all the advances in education that may be attributed in part to it, educational research has not kept relative pace with other areas of man's endeavor. A notable disparity is found in medicine where research in medical technology and the supportive biological and physical sciences has far outstripped research in the training programs and in the dependent psychological, sociological, and other disciplines of the humanities. This lag in educational research undoubtedly is due, in large measure, to inadequate financial support, to lack of sympathetic attitudes, to insufficient rewards to researchers, and to other reasons to be discussed in this issue.

In attempting to produce a special issue of PHI DELTA KAPPAN that would add to the professional competence of members of the fraternity, and of educators in general, the Commission on Research has been almost overwhelmed by the scope of the subject. These were some of the choices it faced: to produce a standard commentary on the findings of research; to produce a volume describing the extent to which new knowledge has been put into practice and an interpretation of the effects of the application; to describe the developments in the science or the methodology of research; to describe some of the latest, most dramatic, and most promising developments in research; or to describe some of the barriers, hurdles, and difficulties of getting research into practice. Any one of these alone, if developed fully, would constitute a task far beyond the time and resources of the Commission. The Commission finally decided to draw some content from all of these fields; to develop something of a broad point of view about research itself, of its contribution to the expansion of education in our society and of other fields in which education is directly concerned.

Our authors have not hesitated to express their views respecting the weaknesses and the strengths of research. They have been equally objective in emphasizing the importance of educational research, and in pointing out the conditions that appear necessary for its improvement.

The Commission is, therefore, much indebted to these contributors, and takes this opportunity to express appreciation of their personal and professional cooperation.

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Research in the Physical Sciences

The author describes science as one of the creative areas of human endeavor, one in which research is an essential ingredient. This creative activity is divided into four separate components: (1) that of the individual scientist, (2) the community of scientists, (3) the area of technology and engineering, and (4) the general public. Research has vastly different impacts in these areas. Each area of science has developed its own peculiar methods of inquiry, some transferable, some adaptable to educational research, and others not.

By FLETCHER WATSON*

RESEARCH is the essence of modern science. The general research approach to physical environment has developed over the past three hundred years, and is still changing. This way of inquiring about the world has been so successful and effective that some have given "science" an aura and prestige of terrifying magnitude. In view of this, my comments will deal with some of the limitations of scientific research, with some of the things which science is *not*. Immediately we should note that the methods of modern science provide only certain kinds of information about certain kinds of things and events. No valid claim can be made that through science one learns "all about" anything or that the methods of experimental science are applicable to all areas of human interest. Certainly aesthetic and religious questions are not subject to the methods of inquiry employed in science.

An Unfortunate Misunderstanding

When the place of science in the culture is discussed there is sometimes a feeling that science as we know it is apart from or in conflict with basic tenets held desirable by the society as a whole. This is unfortunate.

Barber, in his recent book *Science and the Social Order*,[1] identifies five major points on which scientific inquiry and the tenets of western culture are congruent. These are: *rationality, utilitarianism, universalism, individualism,* and *progress and meliorism*. By *rationality* is meant the assumption that the phenomena of the world can be reduced to order through reason. Basic to this is free inquiry on all topics of interest. Not only in science but also in industry, in politics, and in government we find this "critical approach to *all* phenomena of human existence."

Utilitarianism is a term employed to mean primary concern with affairs of this world rather than "other worldliness," a concern prevalent in western Europe during the Middle Ages and in [illegible] of the cultures of the Far East. To some extent concern with the affairs of this world may appear as a feeling that men are "God's stewards" to take care of the earth; it may, but need not, become "materialistic." *Universalism* seems, to Barber, to represent the freedom of each individual to seek and to choose his own life's work. If successful, the individual is then treated and judged by applicable science norms. It is directly counter to privilege by birth, race or color.

Individualism places responsibility for a person's life upon himself, and removes it from the dictates of some other organized authority. Such an attitude is especially conducive to development in the creative arts, whether painting, music, literature, or the sciences, and it is contrary to "planning" or forced direction of activity. Finally, *progress and meliorism* is based upon the belief that active rationality should improve man's lot in the world, and that the results of such rationality will be cumulative.

Science Flourishes Under These Precepts

Barber observes that in no society are these characteristics found in perfection, and that each,

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[1] Bernard Barber, *Science and the Social Order*. Free Press, 1952.

to some degree, may be in conflict with other ways of looking at the world. He further shrewdly observes that some form of science will exist even though several or possibly all of these characteristics are abandoned by the society. However, the type of scientific activity which has developed in western societies during the past three centuries appears to be consistent with and to flourish when these precepts are widely held.

Part and Parcel of Total Culture

Despite easy statements to the contrary, science as we know it is still part and parcel of the total culture. The basic, unstated philosophical milieu within which a scientist is reared and in which he operates is the culture of the time; it permeates what he will do and how. Only to a minor degree, and slowly, do the results of scientific investigations and their possible technological applications affect the speed or the degree in which various of these precepts are accepted and emhasized in the society. One would be very rash to assert that the scientist was apart from society or that his work dominated the concept of the "good life."

Specifically, we do not have a technological society because scientists have been successful and engineers skillful, but rather because we have desired the fruits of technology as this form of enterprise flourished. The distinction may be made clear by recalling that the Chinese knew of the magnet and of gunpowder long before they were known in western Europe. Because their center of concern differed from ours, we may note, perhaps with some envy, that the Chinese used gunpowder for gentler purposes than did our ancestors. Or in a more recent example, we do not have atomic bombs because scientists were inherently destructive, but rather because the nations of the world drifted into a war which, in turn, motivated the government to buy two billion dollars worth of effort to see whether the laboratory discovery of nuclear fission could be developed into a dreadful weapon.

As the successful application of experimental inquiry has expanded and matured, thoughtful people have examined into those extravagant claims made by some scientists over the decades. Rapidly disappearing is the assertion that through scientific exploration man has contacted "reality." The current and more modest view is that the scientist describes selected aspects of what occurs in the world, either commonly or under special experimental circumstances, and then attempts to "make sense" out of this additional information. The kind of sense accepted by the scientist must meet certain criteria which are important to science *per se*. Of first importance is the criterion of fruitfulness—that is, the ideas developed as explanations must be fruitful of further experimentation and inquiry. Otherwise the ideas may be neat but sterile. In addition, the ideas should be as economical as possible, in the sense that the number of assumptions should be at a minimum and the generalizations terse and explicit.

These components of modern science are important for they lead to the continuation of such inquiry under its own internal set of checks and balances. Ideas and information advance together and neither can far outstrip the other.

This picture of science, as seen by the scientists, differs greatly from that commonly held by non-scientists. All too often science is vaguely visualized as the progenitor of bigger, shinier, more expensive, and sometimes more dreadful gadgets and devices. The production of these devices falls in the area of technology, which is markedly different from science and is heavily motivated by social necessity and monetary profit. In fact, it may be helpful for us to examine science as consisting of at least four separate components. S_i is science to the individual scientist. All too often we overlook the fact that creativity resides in the minds of men and that an idea first occurs to some one individual before he can communicate it to any others. In science, as in any of the other creative areas of human endeavor, the individual is paramount. James B. Conant has observed that one first class scientist is worth more than ten of lesser ability. The way in which the individual creative scientist looks at the world and at his own life strongly influences the phenomena he will consider and what aspects he will abstract for theorizing.

Utility Separates Wheat From Chaff

S_s represents the community of scientists. Through their professional meetings and journals they scrutinize and criticize the proposals made by themselves as individuals. Such open scrutiny and appraisal of results guarantees a stability and continuity to the scientific inquiry far greater than could be provided by any outside agency. Within this society of scientists each individual decides for himself, and may change his mind if he is so inclined, regarding the usefulness of any particular proposal. A time delay in the acceptance of new ideas is then inevitable. Any radical idea is by definition likely to attain little initial support, but the long-term test of utility operates to separate the wheat from the chaff. This is illustrated by a story about the famous Swedish

chemist Arrhenius whose doctoral dissertation contained novel ideas about chemical ionic reactions. The board of reviewers were not able to appraise the possible long-term value of the ideas. They decided that if the ideas were incorrect they should not have been presented as the basis for a degree, but that if the ideas were correct Arrhenius would not need the degree. (P. S. He did *not* need the degree.)

Selection Determines Development

S_t is the area of technology and engineering where the ideas and information of the society of scientists are translated into things and operations for social use. Numerous selection screens operate here to determine what will be developed, by whom, how, and when. On one side we may have the idea of the "social good" whereupon the government, local, state or national, may take the responsibility for certain developmental work. This might involve the construction of a dam for flood control and generation of hydro-electric power. Or it may involve the development of new weapons asserted to be necessary for the security of that society. On the other hand it may be a development carried on by private enterprise where the primary criterion is the monetary reward to be expected.

S_p is science as seen by the general public and for the most part this consists of a distorted image of S_t, modern technology. In this day of electrical gadgetry, radio, and television it is perhaps a surprise to learn that the identifiable beginnings of these modern devices lie back in the 1830's with the work of Michael Faraday. His simple equipment and experiments, guided by a most penetrating insight and wisdom, appeared to be "utterly impractical." At one time a venerable dowager is said to have asked him, "Mr. Faraday, what is the good of all this?" To which Faraday replied, "But madam, what good is a new born baby?"

More than two decades later James Clerke Maxwell extended the studies of Faraday and of others in a beautiful set of mathematical equations—here again "obviously impractical." After another two decades, in the 1880's Hertz began "impractical" experimentation to see if certain conculsions derived from Maxwell's equations might have any counterparts in experimental science. Thus wireless and modern radio and all the other communication devices were conceived, but they appeared slowly over decades. Every field of modern science has likewise had a long period of gestation, and of babyhood.

If any peculiarities exist between science and other types of creative human endeavor, these differences reside in the types of data and phenomena available for study. Certainly the differences between the various sciences are themselves a reflection of the differences in the information on which thoughtful people can ponder. Geology is inherently different from physics, not because one is "better" than the other but because the types of information available to the investigator differ. In fact, a course in "comparative science" like comparative religion or comparative education might be profitable to both future scientist and future layman.

The Implications for Education

Such a view of modern science has strong educational implications. First, science is one of the creative arts. Out of the disciplined imagination of men come ideas which tersely organizes diverse phenomena of the world in economical generalizations. Only through informed and imaginative individuals does this occur. Obviously, our schools should then help to identify and to encourage all such creative individuals.

Also, we should show those who prefer some other field of work the actual nature of scientific inquiry. Far too often, however, we find science classes consisting of the bare bones of science—encyclopedic information—with all the functional viscera and guiding mentality eliminated. Little wonder then that many adults have come to look on science as frightfully dull and upon scientists as strange people.

If any useful lesson can be transferred to research in education, it would be that each of the sciences has of necessity developed both its own methods of inquiry relevant to the available data and its own set of postulates. In education we would do well to stop mimicking the physical scientists.

Knowledge Grows by Small Increments!

A final aspect may also be worthy of transfer to education and the other social domains. In science, thousands of individuals are patiently attempting to add to available knowledge and theories. For the most part these inch along, growing by small increments, and within the total field of science any particular result is a very modest addition. Unfortunately, in education it seems that each small increment of knowledge is exaggerated out of size and context to appear as the panacea to all our intellectual and social ills. New fads in education appear overnight like frost, but soon melt away to small, useful residues. Let us be more modest about our results and ideas and more productive of them.

Research in Business and Industry

In business and industry the line between research and technical application is often not well defined. Competition has been the underlying cause of growth in volume of research in these areas. Government has assumed an increasing role. Research in these areas has had an impact in colleges and universities.

By L. L. WATERS*

RESEARCH on a major scale would itself be necessary to measure, even approximately, the scope and impact of research in business and industry; the researcher would be likely to secure evidence of effects only—something that cannot be put into statistical tables. He would find, however, that the volume of business research is so huge that even if the results were never translated into plans of action and carried out, the sheer cost in money and manpower would have a significant effect on our economy.

Business Research Classified

Business research takes many forms. Like other investigations, it may be divided into pure or fundamental research, and applied research. The meanings of these appellations are the same as in any other field. There are, of course, other classifications. Sometimes it is divided into basic product, application advisory, production process, and production equipment research. These classifications deal primarily with the development of products in industrial research laboratories. Still another classification breaks up business research into the various areas of business study, such as accounting, business education, business-government relations, finance in its many forms, insurance, management, labor, marketing, real estate, transportation, and public utilities.

In business, the line of demarcation between research and prosaic operation is not well defined. An accountant, for example, may well be engaged in research at all times because he is recording precise information and packaging it in a form which management can analyze and use in making decisions. Decision-making in all walks of life is commonly preceded by an accumulation of information and evaluation. Only in those things which people do by whim or caprice is no research involved, however informal it is.

Growth of Business Research

The principal cause of growth in business research in the United States has been sharp competition among enterprises, and especially the great increase in their number. The struggle for survival of an increasing number of businesses puts a premium on full information about the nature of costs, the desires of consumers, the impact of governmental policies, and a host of other considerations. The business which remains in relative ignorance is likely to perish. An additional factor promoting research has been the dynamic quality of business, and the resulting obsolescence of techniques of an engineering as well as of a business character. Our economy might have been featured by an increasing number of businesses competing on a rather casual basis. Instead, however our business firms are vigorously endeavoring to compete by developing new products and new ideas. These involve research.

For many years, uncertainty about the business outlook was said to be an important consideration in channelling personnel into research. The same factor is as powerful today, although the attitude of business researchers is somewhat different. In years gone by, business and educational leaders assumed that the country would follow the usual undulations in the business activity cycle. So-called "long range planning" meant adapting enterprise to the recurrent ups and downs in activity and finding out whether the *present* was down on the way up, or up on the way down. During recent years the role of

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government has become so great that researchers worry much less about the business cycle. They spend a far greater portion of their time attempting to anticipate those changes in fiscal activities which have such a dominant effect on the volume of business and its profits.

The increasing complexity of society has caused research to become equally complicated. A growing number of projects take the form of integrated research. No longer is it possible for the chemist or the metallurgist to study alone. Likewise the business researcher cannot work independently. The last decade or two have witnessed an unprecedented increase in the volume of integrated research. This involves the use of personnel in many different fields of study for the purpose of comprehensive treatment.

Earlier, mention was made that by some standards everyone does business research. If formal standards are established, the number is far less but still impressive. In 1950, there were 2,845 industrial research organizations in the United States, according to the National Research Council. This was approximately ten times the number of organizations in existence thirty years earlier. Moreover, the average size of the organizations had more than doubled. In addition to the research departments in industry, agencies of the federal government, especially in the realm of atomic energy and in agriculture, had assumed huge proportions. Research institutes had been established in several major cities where extensive business research was carried on. Examples of these are the Armour, Mid-West, Battelle, and Mellon Institutes.

Business Research and Who Does It

By 1950, management consulting firms had developed by the dozens and these devoted most of their activities to business research and its final applications. Numerous free-lance consultants busied themselves on a smaller scale, but in similar manner. Last, but certainly not least, every self-respecting university had either a bureau of business research, an institute of economic research, or some comparable department or agency. Smaller schools that may not have departmentalized the research function played equally important roles in investigating new ideas through the activities of individual faculty members. Anyone associated with an academic institution knows the premium placed upon research and writing in relation to academic achievement, as well as the practical fact that promotion may well be based upon research productivity. Thus the pressure for volume production of research is quite great, sometimes at the expense of quality, and, indeed frequently so.

The previous discussion appears to divide research into compartments and yet it is wrong to think of it in this manner. A pool of research personnel exists, more fluid than the preceding categories would indicate. There is a continual flow among industries, government, and universities. An analysis of leaves of absence granted professors of economics and of business would give abundant evidence of this interchange of manpower. Of even greater proportion is the interchange of ideas which result from either cooperative or joint projects or from personal contacts. Research in each of the agencies conducting it is not independent of the activities going on elsewhere but is a part of a surprisingly well-coordinated program.

How Research Is Financed—and Where

Business research today is intimately integrated with product research, hence great difficulty is encountered in segregating costs. Figures indicate that in recent years the federal government has been spending between one billion and one and a half billion dollars on research. Many projects have been exclusively of a business nature, others are predominantly outside the realm of business. Still others are in a broad twilight zone. The volume of research in this latter area is so great that no very satisfactory estimate can be given. Some of the things falling clearly in the realm of business and economics are not easy to classify as research. An example is the statistical fact-finding in some of the series released by the Bureau of Labor Statistics. There is a plausible argument that research is done when the Bureau ascertains what changes should be made in the components making up the cost of living index or any similar price index. Are the more or less routine activities associated with gathering the prices used in the index each month also research? A "pat" answer is not easy.

Non-federal sources are estimated to contribute more than one half billion dollars a year to research, some of it in support of business research. Such expenditures may well be relatively small, but significant out of all proportion to the amount. Research in business and economics often is surprisingly inexpensive. The cost of machinery to effect a certain technological development may be extraordinarily high. The market research to discover whether or not the product will sell may cost only one per cent of the total research budget. Yet the one per cent spent to get a categorical "yes" or "no" answer may well

be far more significant, and spent more effectively than the other 99 per cent.

Much of the economic and business research done by university faculties is free of cost so far as explicit outlays are concerned. A professor may choose to investigate on his own, expecting rewards to come in some other manner. He may undertake a project that would involve substantial expenditures if a corporation were to do it, and yet the only cost to any organization or to the university is found in a few travel vouchers. A definitive answer to the amount of research done in educational circles, and the cost there of, might well entail a survey of all professors in the realm of business and economics, using such shortcuts as sampling techniques would permit.

Sources of Research Support

Support given professors in their researches has changed substantially during recent years. In the biological and physical sciences the government, through its contracting program, has allocated tremendous sums to research in universities. Comparable allotments have not been made in the area of business and economic research and yet increasing sums of federal origin are being expended in universities for research in business and economics. In increasing numbers, corporations have turned to the universities. There has also been a substantial increase in the volume of private and corporate funds available directly to faculty members. Research foundations have often been the primary recipients of grants or contracts and they have been the disbursing agents to persons doing the work. Last but not least, states have been providing for research in increasing amounts in budgets made available to tax-supported institutions. Private schools have matched the tax-supported institutions in supporting investigations by their staffs, partly as a result of need and partly to keep in competition.

Business Research—and the Professor

Business and economic research is not necessarily done where the funds are located. University projects take personnel into all the avenues and alleys of business. Few know how many complications develop in providing freedom of movement to faculty members on research projects. Many universities are reluctant to finance projects which go beyond the boundaries of the state. Other universities are reluctant to authorize travel to distant points. Still others think that there are "safe" and "unsafe" topics. Research activity may be in spheres, therefore, which are not logical from an objective point of view.

Generalizations are dangerous and especially so in this section of this paper. Schools differ so much in policies regarding research activities of staff members that the impact of research will differ just as much from school to school as the policies differ. In an administration where faculty members are encouraged to probe the frontiers of knowledge, there is far more likelihood of an alert group of teachers who keep abreast of the times. The teacher of business and economics who does not engage in research is not likely to be interested in the efforts of his more industrious students and colleagues. But, not every member of a faculty needs to be active in research—certainly not in the more formal and technical aspects; an interested portion will give tonal quality to an entire staff. Discussions of problems with colleagues who do less formal research is certain to develop a more stimulating atmosphere for teaching, learning, and investigation. Lastly, colleges and universities are moving more and more into graduate activity. One of the important cornerstones of graduate work is research. Advanced degrees in the field of business and economics are not likely to be of quality when they come from institutions whose faculty members do little research. Preparation of theses and dissertations is an integral part of work at the master's and doctoral level. Satisfactory supervision is not likely to come from men who are not learning by similar experiences.

Following Hobbies Is Not Research

Limits exist to research as they do to most other good things in life. Administrators have a responsibility to seek the advantages of research without acquiring some great disadvantages. Some faculty members may be carried off by enthusiasm for their area of special interest. This interest may be narrower than the confines of a single course, and on some facet which is obscure in the minds of most people. Students have been known to walk into classrooms and fail to get instruction in public finance; but they do learn all about the salt tax in ancient Rome from the year 19 A.D. to 21 A.D. In transportation courses three hours credit may be granted to students who unwillingly listen to a recitation of the timetables of railroads abandoned 75 years ago. The administrator has the responsibility to direct his staff to use research in the interests of better teaching rather than worse. Shortcomings of preoccupation with research are evidenced by frequent absences from class, inadequate testing and student counselling, and failure to assume committee and community responsibilities.

The Impact Upon Colleges and Universities

Without intending to paraphrase a famous statement by a cabinet officer, the assertion can be made that "what is good for professors is probably good for schools and universities." An intelligently directed effort in the realm of business and economics research will consistently redound to the benefit of the school. Shrewdly distributed projects, carefully planned and executed, are certain to command attention and respect. They will, in turn, open far greater opportunities for studies with greater chances for success. A business research bureau which honestly and effectively probes one or two areas will find rapidly widening opportunities for service; the reputation of the school will grow; and far greater support of education gained from many through private or public channels. The repercussions of a limited amount of good research are likely to be far greater in scope than the performance warrants.

A few years ago a professor in a large university used the short form in making out his federal income tax return. That task was simple. He shifted to the state form and was forced to list all of the items which he had been permitted to lump in the federal return. Thus for the seventh or eighth year the economy of the federal short form was nullified by the long form of the state. A research project followed and the new state short form, for those who were eligible to use it, included the "built-in" graduations of the federal short form. Today several states use the short form. There are no losers in such an innovation, and certainly the general economy and the government are gainers.

The Impact of University Research

Choice of an example to show how research in universities has influenced the locale of industry is more difficult. There are so many cases in point. A project may call attention to the water, labor, material, or other resources of a community. The information is taken by chambers of commerce, trade associations, or other mediaries directly to companies interested in re-locating or directly to men of means interested in investing in new enterprises. Within a matter of months payrolls, markets, and the good things in life follow. The list of successful undertakings is impressive but so is the list of projects which have been completed and now gather dust on library shelves. Another list is impressive though short. This is the record of furors associated with certain projects. Some university efforts in business and economics research have been somewhat less than sound; sometimes they have been sound but somewhat less than politic. In either event, they have been embarrassing. Administrators have a primary responsibility to see that research is sound, that conclusions are based upon it, and properly qualified in case definitive statements cannot be made. Administrators should not divert personnel and resources from important research projects just because the results might not be popular. If the subject is important it should be investigated and the results made available to all in the democratic manner. University research projects are of great value to outside groups, not only because of the studies themselves but because of the stimulus given to creative work in government and industry. The contacts which outsiders have with university personnel are just as stimulating to those in industry as industry contacts are to professors.

An Audit of Success

Proof of the pudding is in the eating. Both educational institutions and industry appear to be well-satisfied with the expansion of business research by educational institutions. Universities of their own initiative are expanding their programs, often aided by grants from private business as well as from government. Most universities take stock of their research programs from time to time and assay the benefits in relation to the costs. Profit in a non-monetary sense has been shown consistently. Cut backs in allotments for research will not necessarily come with a lower level of business activity. Quite the opposite reaction is likely. The federal government may alter from time to time the amount of support given to universities, reflecting changes in the philosophy of government. Business support to universities may not vary so much since every businessman knows that research today controls profits tomorrow. For the sake of better business and better universities, some of the research should be assigned to educational institutions or be instituted by them.

The unspeakable beauty of wisdom naturally attracts and holds our minds with full admiration. Its magnificence and dignity force us by its infinite virtue to tread in its footsteps . . . whatever is natural to man, whatever becoming, whatever useful, whatever magnificent, . . . is altogether worth while to be acquired in the pursuit of wisdom. —Roger Bacon.

"My interest is in the future, because I will spend the rest of my life there."—C. F. Kettering.

Impact of Research in Agriculture

The current position in agricultural research is unfavorable. New findings are not being turned out as fast as they are being used. Research ceilings must be pushed upward at a faster rate if a reservoir of knowledge is to be maintained, ready to be called upon in an emergency. In fact, we must run faster just to keep even. These are the conclusions of Dr. Shaw, Administrator, Agricultural Research Administration, U. S. Department of Agriculture.

By BYRON T. SHAW

AGRICULTURE faces a tremendous job in the next 25 years. Our population is now growing at the rate of 2½ million a year, and the Census Bureau estimates that by 1975, under moderately favorable conditions, it will reach 190 million. This means that American farmers will have to produce about 30 per cent more by 1975 if they are to provide adequately for all our people. A 30 per cent increase calls for an extra billion bushels of corn, nearly 4½ million more bales of cotton, almost 3 billion pounds more beef, and an increase of more than 1½ billion dozen eggs. In terms of 1950 yields per acre and 1950 consumption rates of food and fiber, we shall need the equivalent of an additional 115 million acres of cropland to produce these extra farm products.

Because such a large portion of our food supplies comes through the route of livestock and poultry, it is not enough just to consider cropland by itself. We must also take into account grazing land and pastures. So when I refer to the number of acres available or needed for food production, I mean our present cropland plus the cropland equivalent of acreages that are now or may be used for livestock feed.

Most Good Land Already Taken

In the past, we have helped meet the needs of our growing population by bringing new land into cultivation. This was the pattern for more than a century as the settlers moved westward. By about 1920, however, most of the good land had been taken. Since that time, a large share of our additional cropland has come into food production because of its release from growing feed for horses and mules. Some small additions have also come from irrigation and land clearing. Between 1935 and 1950 we were able to add a net equivalent of 38 million acres of cropland for the production of food and fiber for domestic human consumption.

Short 70 Million Acres by 1975

The application of science and technology also gave us a big increase in production between 1935 and 1950. Improvements on the farm through science gave us food and fiber equivalent to the products from 64 million acres.

All told then, we increased our food production by the equivalent of 102 million acres between 1935 and 1950. That was enough to provide not only for the increase in population that took place during that time but also for those improvements in diet that we enjoy today.

Now, let us consider some of the possibilities envisioned for increasing our cropland acreage between now and 1975. Instead of 38 million acres released from producing feed for horses and mules that we got during the last 15 years, we can expect only about 15 million acres from this source by 1975. According to plans of the Bureau of Reclamation, the Army Engineers, and the Department of Agriculture, we may bring an additional 30 million acres into full production by irrigation, drainage, clearing, and flood control. These two items could give us 45 million acres of the 115 million that we are going to need. So, according to plans and the best estimates I can get, it looks as though we shall be short somewhere in the neighborhood of 70 million acres in 1975.

I do not mean to give the impression that I think there is any danger of people going hungry in the United States in the foreseeable future. There are many courses of action that can be taken to prevent this. For one thing, we can bring in more land than is now contemplated. There are millions of acres of unproductive land that can be reclaimed, but this will mean higher prices for food and clothing.

Another possibility is to stop all exports or greatly increase imports of agricultural products. But if we stopped all exports of these commodities, they would provide only a fraction of what we will need in 1975.

If absolutely necessary, we can eat more cereals, potatoes, and other plant products and cut down our consumption of livestock products. More acres are required to feed a family with livestock products than with plant products. This would be a difficult choice, however, because we are meat-eaters and milk-drinkers.

Our greatest opportunity for making up this deficit is in better use of the land we already have. This assumes greater efficiency in production on farms and improved distribution, utilization, and marketing after the products leave the farm. We have already made great strides in this direction, but not fast enough.

A simple way to size up the job ahead and to compare it with what we have done in the past is to look at it on a year-to-year basis. Science and technology currently are giving us the equivalent of about 5 million acres of cropland each year. But that is not enough. Under our present standard of living, it takes about 3 acres of cropland equivalent to provide food and fiber for one person. Since we are growing at the rate of 2½ million people a year, we need to add the equivalent of 7½ million acres of cropland each year instead of the 5 million we are now adding.

Research the Key to Gains

In looking at the gains in the last 15 years, we should remember that they include hybrid corn, the use of nearly three times as much fertilizer, DDT and other new insecticides, new disease-resistant crop varieties, and soil conservation.

The key to these gains was research, and re-

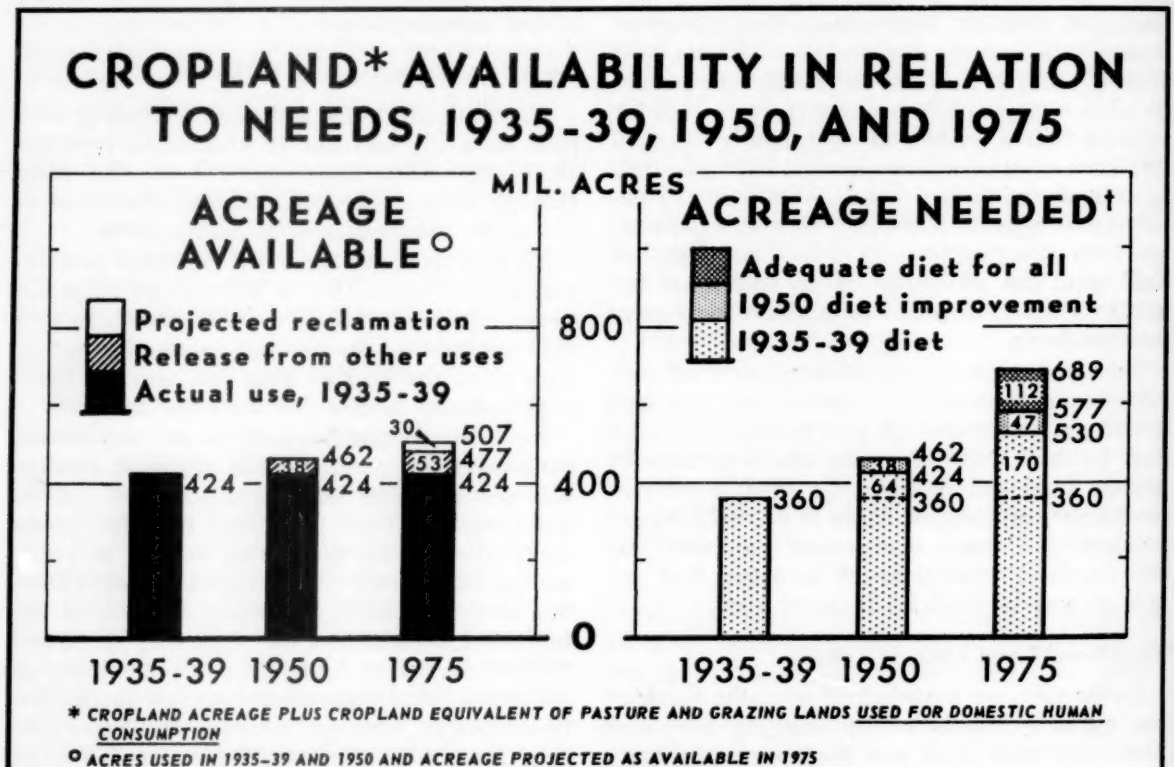

Fig. 1. Cropland Availability and Cropland Needs for the Period 1935-1975. Based on Adequate Diet Requirements and a Projected Population, in 1975, of 190 Million.

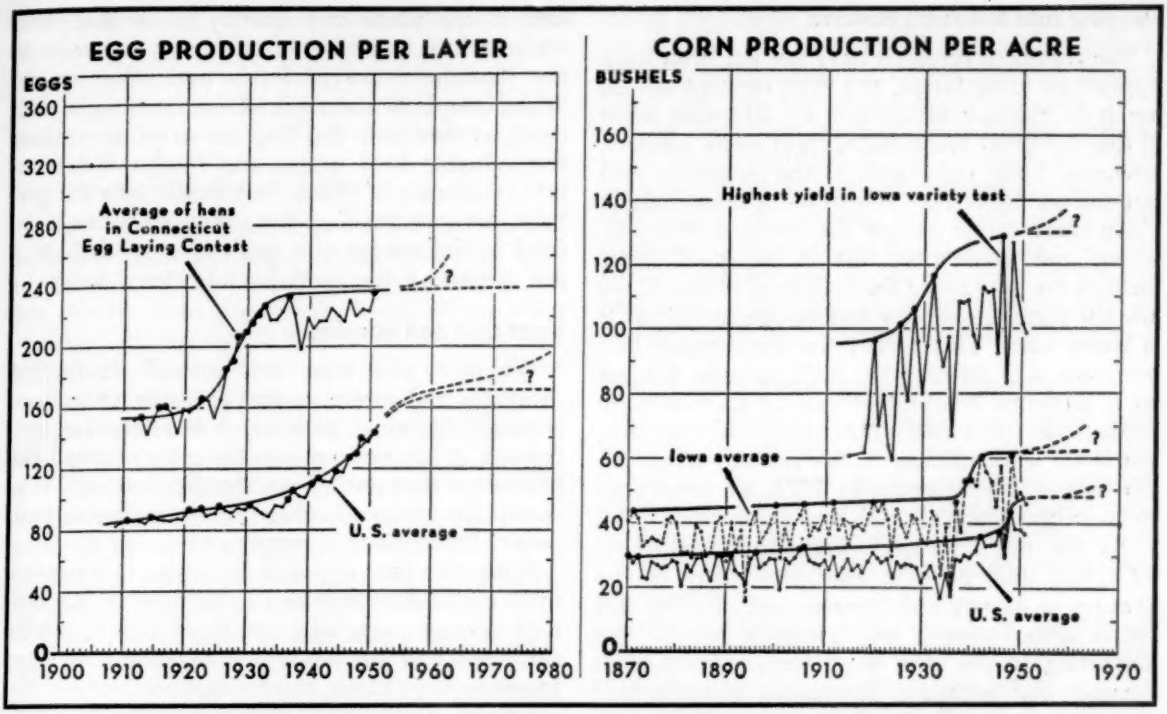

Fig. 2. Growth of Egg Production Over 40-Year Period, 1910-1950. Note Time-Lag in General Use of Research Knowledge, and Production Differences.

Fig. 3. Growth in Corn Yield per Acre Over 80-Year Period, 1870-1950. Note the Effect of Introduction of Hybrid Corn, Between 1930 and 1940.

search plus technology will be the key to the increased production that we must have in 1975. We all remember the great production job the farmers did in World War II. They would be the first to say that they could not have done it without the help of science. They are adding billions of dollars to their income every year because of the agricultural research of past years.

Millions in Profits From Research

Broiler producers, for example, have increased their gross annual income sevenfold since 1940. Research gave them the know-how to breed the kind of chicks that make good broilers, to reduce losses from diseases, and to feed for fast and efficient gains. Research on antibiotics alone is annually saving poultrymen 100 million dollars.

Hog producers are saving at least 3 million pigs a year because of the research that developed the virus-serum treatment for hog cholera. This disease formerly caused losses of as much as 65 million dollars in a single year. Discovery of phenothiazine several years ago has been worth 10 to 15 million dollars annually to American farmers. It is the most widely used remedy for internal parasites of livestock.

Growers of cereal crops are making an extra half-billion dollars every year because of disease-resistant varieties and increased yields made possible through research. On oats alone, farmers who grew improved varieties resistant to rusts and smuts made an extra 150 million dollars in 1944 and again in 1945.

Farmers in one-variety cotton communities, based on research-developed varieties that produce uniform lots of high-quality cotton, are receiving about 70 million dollars a year in premiums and better yields. Mechanization has reduced the cost of production. The mechanical picker and new methods of weed control promise to level down the two peaks of labor in cotton raising and harvesting.

Sugar-beet and sugar-cane growers would not be in business at all if research had not given them varieties that resist curly top and mosaic disease, which threatened to wipe out our sugar industry. Instead, sugar crop growers are reaping the benefits of research at the rate of an additional 20 million dollars a year.

These are but a few examples of the financial returns from investment in agricultural research —without even mentioning the three-quarter-billion dollars a year from hybrid corn. They also illustrate how research and technology can take the place of millions of acres of cropland for producing food and fiber.

Digging Into Research Reserve

The results of research have not yet been fully applied on many farms, and most farmers can do much to increase production by adopting more of the improved practices. A great many farmers, however, keep right behind the scientists and put the results of research to work immediately. From these farms we get the leadership in efficiency and production. But at the speed these farmers are now using the results of research, we are not turning out new knowledge as fast as it is being used. This means we are digging into our reserve of information built up over the last 30 to 40 years. Possibly we can go on increasing production for a few years using old research, but if we want farmers of this country to do the job they will have to do by 1975, we must continue to back them up with new research.

To get the increased production needed in 1975, we shall have to eliminate many of the ravages of insects and diseases and develop still better crop varieties and livestock breeds. We are losing 10 per cent of all farm animals from diseases and parasites. Brucellosis alone is taking an annual toll of a billion pounds of milk and millions of pounds of beef. Newcastle disease can reduce egg production by 50 per cent in 3 months' time. Coccidiosis in poultry, lambs, and calves costs our farmers 50 million dollars a year. Insects still take a toll of 4 billion dollars worth of crops and livestock every year, and plant diseases threaten several of our major crops.

Better Marketing Also Needed

In addition to increasing production, we shall have to find ways to improve the marketing, distribution, and utilization of our farm products. Estimates run from half a billion to more than a billion dollars damage to grain in storage each year. Insects and rodents and inefficient storage on farms alone are taking an annual toll of food and feed grains from about 6 million acres. When considered in terms of corn equivalent, this means we are losing 200 million bushels from this one source—enough to feed more than 11 million hogs to 220 pounds weight.

Up to 30 per cent of some of our fresh fruits and vegetables are lost between the farm and the consumer through spoilage. A study made a few years ago in 13 states showed that one-third of the eggs marketed had dropped below "A" quality by the time they reached the first buyer. The figure increased to nearly half by the time they reached the assembly point.

We need to know much more about transportation requirements and how to avoid glutted markets in one place and scarcity in another. And we certainly will have to cut down on waste in the household use of foods and other goods. When people waste much of the fat bought with meat, as they now do, they are in effect wasting the valuable feed grains and forage that went into producing it. When they throw into the garbage can uneaten food from their plates or leave food in the refrigerator until it is spoiled, they are increasing the need for additional acres.

Shortages and Surpluses

We must also take into account fluctuating shortages and surpluses that occur in agriculture generally. As much as research has done for agriculture, it has not yet substantially reduced the difficulties that come from weather, external economic changes, and other things that cause temporary fluctuations in supply and demand.

When the four regional chemistry laboratories were established by the Department of Agriculture several years ago, we were facing terrific surpluses, and our job was to develop new ways to use farm products and to improve many of the old ways. Everyone is now familiar with frozen orange juice concentrate. But not everyone knows this new product, developed at one of these laboratories, averted a disastrous depression in the Florida orange industry.

During World War II, the demand for farm products made history. We then had the job of stretching supplies to make them go farther rather than thinking up ways of using the surplus. Again agricultural research had an important and necessary job, finding substitutes for scarce materials, making use of products formerly wasted, and doing a better job of preserving both food and non-food products.

Since World War II, we have seen both surpluses and shortages in various farm commodities. So, whether in abundance or in scarcity, efficient utilization of farm products is an important part of our economy.

Production From 70 Million Acres Needed

Our big job between now and 1975 is to find a way to provide as much additional food and fiber as could normally be expected from 70 million acres of cropland and pastures. And since research and technology have brought us big gains in the past, it is only logical to look to this source for continued future gains.

This brings up the question: Are we doing enough research to guarantee that we shall have the needed answers to provide the extra food and fiber that we shall require?

Some time ago, I became interested in the relation between production on farms and production where all research knowledge is put to use, such as on experiment stations. So I decided to study some of the major farm commodities.

Research Ceilings Near—Unless

I started with eggs. I compared production on farms with that in the Connecticut Egg Laying Contest at the State Experiment Station. In this contest, hens are entered from all over the country with the main objective of breaking egg-laying records. In studying the records of the contest, I found that there was a sharp rise in egg production between 1920 and 1935 but that since 1935 the production records have leveled off. It looks as though we may have hit a ceiling in egg production in those cases where all known research facts are utilized.

Egg production on farms, on the other hand, has been rising rather rapidly for the last 15 or 20 years. It is fairly certain that this rise is a delayed response to the advance of knowledge between 1920 and 1935. Since 1935, however, we have used a lot of research knowledge *reserve*, and research has not been adding new information as fast as it is being used. This means that the average production on farms will not continue to rise at current rates for long unless the research ceiling on egg production is raised.

My next study was corn. I compared the average corn production on farms with production in the Iowa Corn Variety Test, which represents rather full application of research knowledge. The yields in the Variety Test began going up sharply with the advent of hybrid corn but have leveled off in recent years. The Iowa farm average lagged several years behind, as would be expected, and began its sharp rise about 1934 as hybrids were adopted more and more widely. This rise, also, has now leveled off. United States average yields have not yet leveled off, but we are rather safe in assuming that average corn yields will not go much higher unless we have a further rise in the research ceiling.

The relationships in egg production and in corn production are typical of what I found in studying several of the major farm commodities such as wheat, cotton, potatoes, hogs, and dairy products.

The research ceiling for most farm commodities is now at or rapidly approaching the stage where opposing forces, such as insects, diseases, and soil deterioration, are pushing down as hard as research is pushing up. The average producer's ceiling is still rising for most commodities, but at the rate we are using our research findings, we can expect a leveling off in the average producer's ceiling unless the research ceiling is again lifted, and new knowledge made available.

How long this leveling off will take will depend upon conditions favoring adoption of new practices. High prices and greater emphasis on extension work and other aids could enable farmers to push their ceiling closer to the ceiling set by research knowledge. But in spite of present conditions, a leveling off in the average production ceiling of some commodities seems imminent.

Two Ways to Raise Research Ceilings

There are two ways to push our research ceilings higher: by increasing the quantity of research and by improving the quality of research. Farm people, farm leaders, and the general public determine the quantity. Scientists themselves are responsible, to a great extent, for the quality of research.

Improved quality, in my judgment, means that more attention must be paid to fundamental research. It is true that important practical problems attract research funds. But it is also true that many, perhaps most, important practical problems require basic as well as applied research for a complete solution. It is through fundamental studies that the really big discoveries are made—the kind that break through research ceilings and lead to the biggest gains on farms.

The job ahead of us is to increase production wherever possible, to prevent declines in production, to cut waste and spoilage in goods during handling and marketing and in the home, and to make better use of all agricultural products.

The fundamental research approach to these practical problems is involved and difficult, but it will be the most direct path to our goal.

[An article on Research in Medicine was planned to follow the three preceding articles. Illness prevented its completion, but it will appear in an early issue.—Ed.]

"From the standpoint of the child, the great waste in the school comes from his inability to utilize the experiences he gets outside of school in any complete and free way within the school itself; while on the other hand he is unable to apply in daily life what he is learning at school."—John Dewey.

A study by the U. S. Office of Education of the Department of Health, Education and Welfare reveals that American cities ranging upwards in population from 2,500 spent less per school child last year than for either of the two preceding years in terms of uniform purchasing power.

The Impact of Research on Education

Research in education has both scientific and philosophical characteristics. Scientific investigation in education is relatively new. Some research findings have been put into practice without adequate validation, with unsuccessful results. Others have been highly effective. There appear to be greater difficulties confronting research in education than in other areas of society. The author believes that scientific study of education has slackened its pace somewhat in comparison with other fields such as business, agriculture and social work.

By DAN H. COOPER*

QUESTIONS about the nature of the impact of research on education are typified in the following: How much difference has research made in the character of organized education? Which aspects of education have been especially influenced by research, and which have been only slightly affected? Are the changes resulting from research desirable? How is research related to philosophy in the achievement of educational progress? What procedures and methodologies of research tend to magnify and accelerate the impact of research on education? Does future research promise to contribute as much to the development of schools as has past research? How may the quantity and quality of educational research be improved?

Examples of the Impact of Research

Many writers have presented thorough and detailed reviews of the extent and the kinds of changes which research has wrought; in fact, a considerable body of research has been produced on the impact of research! For example, several careful studies of the influence of school surveys (if school surveys may be accepted as a type of research) have been completed, giving repeated testimony to the contributions of survey research to the development of school organization, school buildings and sites, administrative procedures, and curriculum in local and state systems.[1]

Another example is found in comparisons of learning under modern and under traditional educational methods. Since modern education has been created, in part, from the findings of research, careful comparisons of pupil achievements under traditional and under modern educational practices may provide a measure of the impact of research upon improvement of learning. Van Til has published a recent summary of studies, comparing learning results under traditional and under modern instructional practices, in which he marshalls an impressive array of accumulated evidence favorable to modern education.[2] In many respects, this evidence presents the most convincing testimony of the impact of research, because it supports the conviction that research has been beneficial in a fundamental way. It is reassuring, for example, in respect to the contributions of educational research and to the quality of modern educational practices, to learn that pupils in modern schools are able to surpass pupils in the schools of a century ago, on identical tests, and in spite of the selective character of the school population then as compared to the present.

A complete catalogue of educational changes attributable to research is probably impossible to prepare, both because research is so woven into the total fabric of education, and because the process by which research creates modification is often extremely subtle. Research is not always expected, of course, to create modifications in educational practices. Much of it is intended

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[1] The earliest study of the impact of school surveys on educational practices is by Koos (Leonard V. Koos, "The Fruits of School Surveys," *School and Society*, V, Jan. 13, 1917, 40); and the most recent study is reported by Harap (Henry Harap, "Do School Surveys Produce Results?" *Nation's Schools*, XLIX, Mar., 1952, pp. 35-38). Several other studies of this type were published during the intervening years.

[2] William Van Til, "Research Affecting Education," *Forces Affecting American Education*, Yearbook, 1953, Association for Supervision and Curriculum Development, Washington, D. C., National Education Association, pp. 119-139.

solely to increase human understanding, without particular action consequences, as in the case of historical studies which, except incidentally, seek only to describe the past. The large amount of current status investigation, providing precise evidence about contemporary conditions, does not in itself offer any guide to the modification of those conditions.

In order to present a systematic review of changes in educational practice which have followed rather directly from research, the following list of advances in education based, at least in part, on research, is presented from the writings of Herbert S. Conrad, Chief of Research and Statistical Standards of the U. S. Office of Education.[1] Other lists of other advances might be presented, but few would deny that the following are major outcomes of research effort:

1. Adaptations of education to individual differences of pupils.
2. Reduction of emphasis on the doctrine of "formal discipline," often described as the view that "a hard subject, unrelated to the child's interest, and unpleasantly taught, will stiffen the child's moral fiber and produce a love of learning."
3. Diversification of the curriculum.
4. Improvements in teaching methods and teaching aids. "At least in some instructional areas, pupils are definitely learning faster; they are learning more pleasantly; and they apply their learning more widely and more intelligently."
5. Improvements in school organization, particularly through the consolidated rural school.
6. Improvements in school buildings.
7. Improvements in financial support for local school districts, principally through state aid.
8. Improvements in methods of educational research, itself.

Has Research Brought Desirable Changes?

The goodness of change ought not be taken for granted, and opinions may differ respecting the desirability of changes which have resulted from, or may in the future result from, research. In general, educators in the United States and of other democratic nations may well regard advances resulting from research as one of the glorious conditions of our way of life. Freedom to do research and to apply research are part of the freedom of the mind and part of that rational approach to problem-solving which should characterize democracy. Changes which result from comprehensive and sound research should be welcomed ardently by the democratic nations.

Some changes which have occurred in education as a result of research have not been good. There have been occasions, and probably will be so again, when the specific results of a particular body of research have been bad for education in the light of further study. For example, the wave of excessive silent reading, which swept through the elementary schools largely as a result of research findings, was found through later research to be ill-advised. The recommendations which grew out of early research on schoolroom lighting and ventilation were later found to be erroneous. But it should be recognized that the antidote to these errors of research was, and is, more research. Some freedom to make errors is essential in the search for better schools.

Not all cultures, even in this contemporary world, can permit rapid changes in their educational systems. In some cultures, impartial evidence can play but a minor role in any modification; large areas of the educational enterprise are not to be changed by any means, research or otherwise. Changes resulting from research, in such a society, would be unwelcome.

Science vs. Philosophy

The effectiveness of research, or of the scientific method, in the advancement of education has not gone unchallenged in our own culture. From time to time, an effort has been made to dismiss those aspects of education amenable to research investigation as the relatively inconsequential *means* of education, and to argue that the all-important *ends* or goals of education can be examined only through philosophical analysis.

Although neither side appears to have gained any clear advantage in logic, the ebb and flow of the argument over the years seems to have had a marked influence on the prestige of and the resources available to educational research. The tendency to view either science or philosophy as the exclusive source of truth, on both means and ends in education, has been marked. Because powerful voices from positions of official leadership have been heard on both sides of the argument, and because the production of either scientific or philosophical conclusions, in education as in other fields, is largely a function of the policies of leadership, it is understandable that research should blossom or wither in accordance with shifts in the balance of power on the side of either science or philosophy.

It is not too late in the course of the debate to suggest that both science and philosophy must be strengthened if education is to advance. Perhaps out of some inclination to favor slightly the science side of the argument, the writer would argue that philosophies of education tend to

[1] Herbert S. Conrad, "Research—Education's Gibraltar," *School Life*, XXXIV, Apr., 1952, p. 97. The quotations are from the same source.

grow out of the culture of a people and are in somewhat less need, therefore, of production from the minds of scholars; whereas research is almost never produced without deliberate and generally costly institutional and individual efforts. If this view is sound, then institutions and individuals need to devote greater energy to science than to philosophy. The fact remains that both scientists and philosophers have contributions to make, even if the most extreme expression of either viewpoint is accepted. Scientists have drawn on eminent philosophers in defending the view that science can throw light on both the means and the ends of education,[1] while the philosophers concede that science is useful in establishing the organizations and procedures which most efficiently gain predetermined ends.

Those of us who, seeing a place for both science and philosophy in the study of education, nevertheless, believe in the energetic promotion of the research phase of the duality, have another vital problem to resolve in the relationship between science and philosophy. This is the problem of orienting our research significantly to a sound philosophy. G. D. Stoddard has made this point forcefully.[2]

Variety of Assumptions Essential

Unfortunately, there is a hazard in attempting to establish in any universal manner the philosophy which shall guide research. It is that all research workers may be forced or frightened into investigations dictated by a given philosophy. Freedom among research workers to operate from a variety of basic assumptions is essential to the productivity of research. It may be more profitable to permit and even to encourage some research which appears to have no adequate relationship to a proper philosophy of education, than to attempt too vigorously to secure agreement among research workers on philosophical premises. The obligation of the individual worker to satisfy himself about his own premises is probably as far as the relationship between philosophy and science should be pushed.

Apparently the lag between the production of research and its application in practical situations is a problem with which workers in all fields are acquainted. Educators are convinced that translation of their research into practice is pitifully slow. Systematic studies lead to the conclusion that typical innovations in education, whether arising from research or elsewhere, require approximately a half-century to gain widespread acceptance in schools.[1]

Many efforts have been made to popularize research through publications, conferences, and otherwise. Not the least of these has been the development in recent years of a specialized form of research designed to be self-translating or self-applying.

As first presented, in connection with the education and government of Indians under the United States Indian Service, the term "integrative research" was used for the new procedure.[2] From apparently independent but simultaneous developments in English colonial administration, the term "operational research" came.[3] The most popular term for the new procedure has been "action research."[4]

Action research, if this term may be used to cover all the conceptions, emphasizes the identification, exploration, and solution of practical problems on a job, either by the practitioner (e.g. teachers, schools administrators, laymen) or at least with the active involvement of practitioners in the study. The specialized research worker serves either as a consultant or as a coworker in the conduct of the research. The unique features of the method are the extent of involvement of the local practitioners, and the direct use of the local situation for the research. The research often consists, actually, in the observation of the outcomes of an application.

Promise of Action Research

To some professional workers, action research hardly deserves the name, research. To others, research which is not action research appears futile and unproductive. Already, action research can probably claim acceptance as an essential phase of the total task of research, with particular advantages in hastening the impact of investigation upon practice. So far, the presumed advantages of action research for influencing practices have been taken for granted, but objective evidence will probably soon be available.

The discoveries of research, during the brief half-century in which scientific methods have been applied to education, have been remarkable. The impact of those discoveries in the field has

[1] John Dewey, "The Determination of Ultimate Values or Aims Through Antecedent or A Priori Speculation or Through Pragmatic or Empirical Inquiry," *The Scientific Movement in Education*, The Thirty-Seventh Yearbook, Part II, National Society for the Study of Education, Bloomington, Illinois: Public School Publishing Company, 1938, pp. 471-485.

[2] George D. Stoddard, "Educational Research Lacks Impact; It Avoids Controversies and Human Values," *School Executive*, XLIX, May, 1952, pp. 44-46.

[1] Paul Mort and Francis G. Cornell, *American Schools in Transition*. New York: Bureau of Publication, Teachers College, Columbia University, 1941, p. 30.

[2] John Collier, "United States Indian Administration as a Laboratory of Ethnic Relations," *Social Research*, XII, Sept., 1945, pp. 265-303.

[3] H. A. C. Dobbs, *Operational Research and Action Research*. Washington, D. C.: Institute of Ethnic Affairs, 1947, pp. 21.

[4] Anno Bellack, Stephen M. Corey, Ronald C. Doll, and others. "Action Research in Schools," *Teachers College Record*, LIV. Feb., 1953, pp. 246-255.

been extraordinary. At least in part through research, schools have probably changed as much in the past half-century as have other segments of society—agriculture, business, industry, or transportation. Education has had the advantage of being one of the last major fields opened to scientific investigation. Techniques of study and attitudes of mind were consequently ready for rewarding scientific work.

Future Effectiveness in Education?

Education, however, seems to place more than an average number of difficulties in the path of productive research. Consequently, there is reason to be concerned about the future of research. There are some signs that the scientific study of education has already slackened its pace.

The nature of education is an obstacle. In common with all the social sciences, education presents to the research worker the complexities of human beings and of their organizations and institutions. At the same time, education shares with the other social sciences a paucity of funds, and of personnel, for tackling these problems.

Research a Delicate Flower

In common with other applied fields of study, such as business, social work, and journalism, education requires of the research worker an acquaintance with a whole series of background disciplines, including philosophy, psychology, sociology, political science, history, economics, statistics, accounting, architecture, and others. Good research is not easy in a field which combines so many specialties. It could be that the productive first half-century of research yielded only the relatively easy conclusions in education, and that a long period of slower achievement will follow as more complex skills are required.

Another characteristic of an applied field of study such as education or business is that it is associated with an established social institution which competes with research for the attention of specialists. Research workers in education are often as concerned about "field services" in the schools as they are about research. Other more academic fields of study also offer field services, but not to the extent of the applied fields of study. There is, of course, no reason to criticize field services. There is reason, however, to be on guard that the demands of field service do not interfere with the equally exacting, although often not so immediate, demands of research. "Bureaus of Research and Service," in which service overshadows research, are quite possible. Not only are the demands of field service likely to draw the time and energy of workers away from research, but the demands of field service are likely also to dictate the type of personnel appointed to specialist positions. Individual specialists who must carry both types of duty may tend to cultivate personal skills and characteristics which distract from research ability. Since research is a delicate flower at best, it cannot be expected to flourish except in a climate which is specifically designed for it.

Unique to the field of education is the self-consciousness which educators understandably seem to have about teaching, impelling them to uncommon professional activity in directions apart from their research. From the teaching viewpoint, and no doubt from other viewpoints as well, these non-research activities of potential research workers are valuable; but they are also distracting. Conferences, workshops, publications, guidance programs, teaching innovations, field trips, off-campus classes, the testing of students, the development and use of audio-visual aids, study councils, and recently the insistent demands of educational television, are typical of the teaching diversions which seem especially attractive to potential research workers. In many instances, of course, these activities are necessary to the identification of problems and the collection of data. Frequently, the activities, however valuable, are simply one more obstacle in the path to research productivity.

Other Opportunities Deadly Attractive

Uniquely among the fields of study, education is engaged in the study of itself, and of the institutions in which it exists. Educators and educational research workers are constantly diverted, therefore, from the study of their field to the practice of it in their own institutions. More often than in other fields of study, educational research workers become occupied in the administration of university extension programs, in the operation of their college or university testing services, in placement services, and in the general administration of university or agency staffs. The attractiveness of these professional opportunities is what makes them so deadly, from the standpoint of getting research done. The loss of good research workers to promotional and administrative activities is not unknown in any field of study, but the problem appears to be larger in education than elsewhere.

Observers of the educational scene are likely to point to the research workers themselves as another major obstacle in educational research. Without detracting in the slightest from the honor and glory of education's many distinguished research scientists, it seems probable that

the typical educator engaged in research has some characteristics which do not help him to produce good research. One of these is a vestige of commendable but unscientific missionary zeal. Certainly many graduate students see their first research project as an opportunity to save the world and to reform education with a single mighty blow. Perhaps this inclination persists even among seasoned staff members.

Whether or not research specialists permit zeal to define their problems and color their conclusions, much of educational research appears to suffer from this bias. In contrast to the detailed, narrow problems and limited conclusions in the mature physical sciences, educational research often gives an impression of trying to solve all the problems of the field with each new and brief research project. Education studies are too seldom marked by sustained, repetitive effort; or by a lifetime dedicated to the thorough exploration of a single issue. Agricultural research has test plots which have been under constant systematic study for decades; but educational research has difficulty in tracing even one generation through a school.

Social Scientists Must "Sell" as They Seek

In addition to the difficulties arising from the nature of the field and the character of its research specialists, educational research is handicapped by contemporary cultural patterns. In this, education is like all of the social sciences. Our culture has not been taught to value research in the social as in the physical and biological sciences. This aspect of our culture finds expression in a host of ways. The "science" classes in secondary schools mean the physical and biological sciences. High school pupils never study "social science"; they study "social studies." Young people who speak of becoming "scientists" generally do not mean that they wish to become social scientists. The culture is accustomed to amateur inventors and amateur astronomers, but not to amateur social scientists. Commercial interests find chemical, physical, and biological scientists so useful that at the last report there were 94,000 professional research workers and 140,000 supporting personnel employed in some 2000 different industries of the nation, at a cost to industry of about two billion dollars.[1] The social sciences, including education, have no such supplements to the research resources of colleges, universities, and related agencies, except, perhaps, the foundations, whose income often is based in industry.

The list of difficulties confronting research in education is long enough to be discouraging. Perhaps because of these difficulties education will not feel the impact of research in the future as much as it has in the past. An optimistic view of the prospects, however, is that a recognition of the difficulties will lead to corrective measures.

Increasing the Impact on Education

At least two problems must be solved in order to increase the impact of research on education. Either the influence of the existing body of research must be made greater through increased application, or a larger body of significant research must be produced. The emphasis in recent years seems to have been on improving applications. The developments of action research, of study councils, and of a variety of encyclopedias and summaries of research, are particularly valuable in stimulating application. In the long run, the production of research appears to be the more vital of the two. "Production," of course, means not only an increased quantity of research, but also an improved quality. Both production and application are necessary; but application will probably take care of itself eventually, whereas production will be achieved only in proportion to the deliberate energy devoted to it. At this stage in the development of educational research, the problems of production appear to be especially challenging.

Recommendations

Having presented the difficulties which stand in the way of production, it is appropriate to list briefly some recommendations which may surmount the difficulties and lead to increased production.

1. An essential prelude to an increase in the quantity and quality of research is renewed dedication to research both on the part of individuals who can do research, and especially on the part of administrators of research institutions and agencies. Institutions can do many things to promote research, particularly by the selection and retention in research of highly qualified workers.

2. Protection from diversions and distractions, both by individual research workers themselves and by administrators of research institutions and agencies on behalf of their research workers, is necessary to create the climate favorable to significant scientific study. Protection does not, however, mean isolation. Research workers must have channels of communication outside their research for both the production and the dissemination of it. Field service

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[1] Bureau of Labor Statistics and Research and Development Board, *Industrial Research and Development*. Washington, D. C.: Department of Defense, Jan., 1953, pp. 42.

A Perspective on Educational Research

Educational research must not be viewed too narrowly. Progress is hastened by the invention of new techniques and methods, making possible more discriminating and more valid inquiry. The author believes that the various methods of research, and at times particular methods, too often have been emphasized for "studying educational problems," with inadequate attention to the value of these methods in "doing something about them." Some remedies are suggested.

By STEPHEN M. COREY*

IN THE LAST analysis, the worth of all educational research is judged by its contributions to the improvement of educational practice. These contributions may be rather immediate, or, as in the case of research undertaken primarily to develop educational techniques, or instruments, or theory, somewhat delayed. In either case, the ultimate test of value is the degree to which educational practice is improved by the research.

An educational inquiry, whether philosophical, historical, psychological, or administrative in nature, is conducted in conformity with certain generally accepted operational principles. These, educational investigators have learned to value for good reasons: To the degree the inquiry is disciplined, the consequences are more dependable, are in closer approximation to reality, and hence provide better bases for decisions.

The Research Process

A number of authors have written extensively about the principles of inquiry which, when applied to problems in education, constitute educational research.[1, 2, 4, 5, 6, 8] Great emphasis is placed upon the importance of (a) objectivity on the part of the investigator, (b) a careful formulation of hypotheses or predictions to be put to test, (c) an adequate design for testing these hypotheses, (d) procuring valid and reliable evidence, and (e) judicious and careful conclusions based upon the evidence.

Progress in educational research has resulted, in considerable measure, from the invention and development of procedures, techniques, and instruments enabling the investigator to increase his objectivity, to better the design of his inquiries, to improve the reliability and validity of his evidence, and to deepen the sagacity and wisdom of the inferences he derives from his evidence. Concrete examples of such inventions are the tape recorder, used instead of hand notes to eliminate subjective factors in recording class discussions, the standardized intelligence test, used instead of teachers' judgments to procure a more reliable and valid measure of mental ability, and numerous experimental designs and statistical operations to improve the pertinence of data, and the quality of inferences from them.

To the degree that research procedures, techniques, and instruments are viewed as ends, and valued for themselves, unfortunate things happen. The niceties of research can usually be observed most meticulously in minor and insignificant investigations. It is easier to be rigorously scientific, for example, when studying the relationship between the height and weight of children at the time of school entrance than when studying the processes of abstract thinking.

Research Procedures Are But Instruments

This overvaluing of certain established research methods has disposed some educational investigators to hunt for problems amenable to study by those methods. The invention of standardized tests of achievement or intelligence, for example, resulted in a great amount of research that involved little more than administering these tests to various populations under various circumstances and subjecting the scores to statistical manipulations. Similarly, the invention by

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Pearson and others of methods that made it possible to determine rather exactly the degree of relationship among variables led to a great number of studies involving little more than the computations of coefficients of correlation. Few of these studies made important contributions to educational practice or theory.

Educational research has most significant results when attention is directed first to an important problem about which too little is known. Instruments and procedures are then sought or invented because they are necessary to the study of this problem. Of central importance are the questions to be answered, rather than the techniques that lie at hand for answering them. As has been said, progress in educational research is hastened by the invention of new techniques and instruments making possible more discriminating and more valid inquiry. Progress is retarded by over-dedication to existing techniques and instruments, often resulting in a neglect of problems not lending themselves to study by the use of these techniques and instruments.

Research and Common Sense

The scientific method of inquiry in education is not an absolute process, sharply and clearly differentiated from the common sense way in which instructional, supervisory, and administrative problems are attacked by teachers, supervisors, principals and superintendents.[2, ch. 4] Research methods of problem solving in education are more realistically viewed as refinements of procedures that have long characterized man's attempts to understand himself and his environment in order that he might better predict and control future events.[3, ch. 4] These refinements result in better definition of problems, in more creative hypothesizing regarding solutions to these problems, in more ingenious designs for testing these hypotheses, in procuring better evidence throughout the process of problem solving, and in generalizing more carefully and thoughtfully from this evidence.

Despite the fact that methods used in educational research differ primarily in degree of refinement from methods used by teachers and administrators in coping with their day by day problems, there has been a strong tendency for educational research to be thought of as the special province of the professional investigator. The administrative set-up has encouraged this view. The researcher usually is a staff member of a university or college department of education, or of a research bureau, either state or local.

It is regrettable that educational research is generally thought to be the prerogative of a relatively small group of professional educational investigators.[2, ch. 1] The assumption is that if the professional investigators, employing research methods, report the results of their investigations, the practitioners will be able to modify their behavior to conform to them. Thus practitioners are considered to be primarily consumers of research.

While events have given some support to this assumption, there is general dissatisfaction, both among practicing school people and professional educational investigators, with the great gap between what *is* done in education and what research studies indicate *should* be done.

Research for Practitioners

The scientific method of inquiry will not have the pervasive influence upon practice that its advocates continuously predict until practitioners, teachers, supervisors, and school administrators, learn to conduct research as a way of dealing with day by day problems.[2] It is not enough for professional investigators to study scientifically the problems other people must do something about, and to publish the results. Making research reports more lucid and specifying applications will undoubtedly result in reducing the gap between what is known to be better and what is done. But most practitioners already know better than they do. An effective way to improve what is done is actually to try practices that seem *a priori* more promising and to determine the consequences. This, too, can be a kind of research—research undertaken by educational practitioners to improve their own decisions and their own actions.

This operational or action research, like the research undertaken by the professional investigator and about which so much has been written, is of superior quality in the degree to which it is (a) objective, (b) carefully designed, (c) procures reliable and valid evidence, and (d) employs judicious and careful generalization.

Researching the Researchers

These somewhat different types of educational research, the one undertaken by professional investigators to discover generalizations of wide applicability, the other by the practitioner to guide his decisions and improve his practices, have much in common. To the degree that each is disciplined and conforms to generally accepted principles of inquiry, the findings will be more dependable. Reports of professional researchers can serve as rich sources of hypotheses to be

tested in action situations by teachers, supervisors, and administrators. This is quite different from the conventional idea of "consuming research findings." It involves conducting research in specific and unique local situations in order to determine the worth of findings of inquiries undertaken to establish generalizations or principles of broad applicability. The process and results of operational or action investigations by practitioners, focused as they are on real problems, might help professional investigators to avoid the pitfall of inconsequential but methodologically precise inquiry.

Research vs. Controversy

At the present time, when public inquiry into public education is common, the need is great for practical, action oriented research conducted in specific communities to test the worth of old or new practices and materials. If this research is cooperative, involving the collaboration of as many as possible of the various persons or groups that are affected by the question at issue, and what might be done about it, so much the better.

Argument about the relative merits of various types of curricular organization or teaching methods rarely involves any research evidence that both speaks for itself and is specifically appropriate to the community in which the controversy is taking place. Sometimes evidence is sought, after the battle lines have been formed, and the word research is used, but adversaries tend to look for what they want to see. Studies or surveys may be conducted to support or to attack current practices but the research attitude, the attitude of scientific inquiry, is lacking.

The Research Attitude

Improvement in the quality of educational research over the past two generations has been, in large measure, a consequence of two factors; First, and this was noted above, the discovery and development of methodological procedures making the research process itself more rigorous, more discriminating, and more dependable; second, and a more subtle factor, an attitude of dedication to research as the best way to study educational problems as well as to improve decisions and actions in respect to them.

It seems to be easier to learn research procedures, per se, *than to become committed to the research attitude.* Mankind has not come by this commitment easily nor have educators.[3, ch. 4, 4, 7] While there have been many discussions of the use of the scientific method in the study of educational problems, there have been, to my knowledge, no research studies isolating and studying the factors influential in the development of the research attitude among educators themselves.

Learning to Value Research

The value placed upon research methodology is undoubtedly learned in much the same fashion as are other values. In the individual case, commitment to the research method of studying educational problems develops as one engages in research, as one experiences consequences perceived to be rewarding. The most intrinsic consequence is intimate experience with improvement in the educational difficulty that the research was designed to ameliorate. For example, the research method of dealing with a teaching problem is most apt to be viewed as good by the teacher who uses this method and by so doing is able to teach more satisfactorily.[10]

This kind of intimate experience with the consequences of using the research method is usually denied the great majority of men and women who view themselves, and are viewed by others, as professional educational researchers. This refers again to the fact that research activities in education have been concentrated in the hands of a relatively small number of men and women, most of whom have little or no responsibility for doing anything about the problems they study. For example, those who have conducted most of the research designed to improve children's reading usually have not been intimately associated with boys and girls as they learn to read. Consequently, the most realistic rewards for significant research in this field are not available to the researchers as first-hand, intimate experiences. The professional educational investigator spends so much of his time investigating that he has little time or energy or inclination left to engage in the practices that his research was designed to improve.

Rewards Psychologically Extrinsic

A complex system of rewards for educational research activity has developed that, in general, is psychologically extrinsic. The research method is valued because it brings increased prestige among other professional investigators. It leads to membership in professional organizations devoted to research, to service on their committees, and to publication frequency, one basis for advancement and promotion in the profession.

The development of an extrinsic value system is almost inevitable, and it certainly is not a phenomenon unique to education, but some of its consequences are undesirable. Attaching so much

value to practicing the research process often results in insufficient consideration of the importance of the problem investigated, namely, that the inquiry gives reasonable promise of improving significant educational practices, and reasonable indications of doing so economically.

The Practical Consequences of Research

The methods of research are of little help in isolating problems most in need of investigation. This probably is one reason why researchers whose greatest allegiance is to method are unwilling to have practicality judgments made upon their investigations. This point of view is frequently defended by reference to research in the physical sciences. It is argued that the best research is basic or pure research, undertaken without any thought of its practical consequences. The analogy is drawn that no amount of research undertaken to improve the quality of kerosene lamps would ever have resulted in the discovery of the incandescent electric light. Or, that no amount of research undertaken to improve dynamite would have resulted in the discovery of practical ways of releasing atomic energy.

These claims are probably true, but their relation to educational research is only approximate. The fact that reference is rarely if ever made to analogies in social science, in developing this argument for pure (impractical?) inquiry in education, suggests that the conception of pure research as used in the physical sciences may not be appropriate to education. It is interesting, too, that statements in opposition to practical research justify pure or basic research because, in due course, it is more practical. This is not, of course, as paradoxical as it seems.

Conclusion

As a conclusion to this statement of perspectives on educational research, I should like to re-emphasize one central idea: The methods of research are not only of value in *studying* educational problems (although this has seemed to be the dominate rationale for educational research during the past fifty years); they can also be of great value to practitioners as they try, not only to *study* their problems but to *do something* about them. It is not as easy to assume the scientific attitude under the pressures of day by day operations of a school as it is to be scientific in the laboratory. But when steps are taken to improve the quality of the research the practitioner engages in as he wrestles with his practical problems, his solutions to these problems will be better ones.

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THE WAY OF SCIENCE

(Concluded from page 2)

group also works for a better social order, but its faith is in construction, not creation. An age of impatience has its hazards."

Thus wrote Dr. Guy T. Buswell in the February, 1935, PHI DELTA KAPPAN, and in casting about for an introduction to this issue on Research, we could think of nothing better to say, and certainly could not say it so well as the foregoing. After nearly twenty years, the statement is so apt that little is left to be said, and little that would be now unsaid.

Reference to Phi Delta Kappans' allegiance to the ideal of research is not an idle one. Witness the December, 1941, issue of PHI DELTA KAPPAN, devoted, as this one *is*, to the subject of research, and countless research articles published in the intervening twelve years. One of the triad of Research, Service, and Leadership, the first is close to every good Phi Delta Kappan.—L.A.

The National Council for the Social Studies has defined social studies as "the overall name for a group of subjects that includes history, geography, civics, economics, and sociology. The term 'social studies' carries no implications of a particular organization of subjects or of any political or social or economic point of view."

Philosophical Approach to Research

Educational research, no matter how "scientific," is not free from philosophical considerations. These are hidden and implicit, if not explicit, in any inquiry. Yet, there is little evidence of any philosophic approach to much educational research. Such research would be improved, however, by clarifying and sharpening the fundamental philosophic issues appearing in specific research activities. Why so little consideration of the relationship between philosophy and research?

By HAROLD B. DUNKEL*

TO SOME READERS an article on the philosophical approach to research in education may seem as impossible as a monograph on the snakes of Ireland. According to their view, whatever one may mean by research, it must be scientific, and hence based on science and not on philosophy. And if philosophy is anything different from science, certainly it has nothing to do with educational research, which is scientific. Or according to another related view, if philosophy is different from science, the word is only a slightly honorific label for what would more honestly be called opinion, prejudice, dogma, or superstition. Yet everyone would agree that this sort of approach to educational research is not in any sense desirable.

Even the Words Are Controversial

The purpose in citing these familiar views is not to stuff straw men but to suggest some of the major issues which lie concealed in the simple appearing phrase, philosophical approach to research in education. Even casual statements like those in the preceding paragraph imply rather definite answers to certain fundamental questions like the following. What is the nature of philosophy? What is its function? What are the similarities and differences between its nature and function and the nature and function of science? What is the proper relation of science and philosophy, once we have defined them, to educational research?

To say that these questions are controversial is a gross understatement. The very words in which they are posed are controversial. Many of them, if taken in any strict sense, seem to imply some particular philosophic system with which they are associated. So, for example, readers familiar with Dewey will be quick to suspect a lurking Aristotelianism in any author who talks about the "nature" of anything. Thus merely to pose the question of what relation philosophy has to educational research is to start a philosophic discussion concerning how the question should be put. Answers to the question will of course be equally varied—and equally interesting.

Many Philosophic Approaches

The proper subject matter of philosophy, its proper methods and its relations to other types of inquiry and to their subject matters and methods are, *par excellence*, the bones of philosophic contention. Thus Dewey, Russell, and Whitehead (merely to take as examples three modern philosophers with some acquaintance with science and some interest in education) each give rather different answers concerning the character of the philosophic enterprise, its relations to the scientific one, and hence, by implication at least, concerning the relation of science and philosophy to educational research. One cannot talk about the philosophic approach, but only about a relatively large number of philosophic approaches. There will be as many different philosophic approaches to research in education as there are varieties of philosophic doctrine.

This statement seems truistic and wholly innocuous perhaps, but the issue becomes sharper if we look, not from philosophy toward educational research, but from research back toward philosophy. The previous statement that there will be as many different approaches to educa-

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tional research as there are types of philosophic doctrine implied that any doctrine would influence to some extent the actual conduct of the research based upon it. Stated from the opposite point of view, the conclusion would be that each piece of research would show the influence of this philosophic approach, the doctrine which underlies it.

Fundamental Principles Should Be Explicit

In brief, this statement suggests merely that any bit of educational research takes certain starting points, methods, terms of analysis, and the like as being valid and appropriate for that particular inquiry. Insofar as these principles concern basic, important matters, they take on what may be fairly called philosophic character. Since the framework for the research undertaking is not more likely to be valid or coherent by reason of being implicit, unconscious or covert, it would seem desirable for the fundamental principles of the inquiry to be fairly explicit, conscious, and overt.

We need not, however, examine much educational research to see that such is not commonly the case. There seems almost a consensus among producers of educational research that fundamental philosophic issues can and should be ignored. Though all such generalizations are hazardous and contradicted by obvious exceptions, this one seems to me fairly valid, as such statements go. In the face of this fact it does not seem proper to present one philosophic view, though the author has a preferred view. Nor does it seem fitting to survey some of the various philosophic positions and examine how each of them would tend to influence educational research. Rather it seems necessary to devote our present efforts to inquiring why there is relatively so little evidence of any philosophic approach at all in much educational research.

Can Research Be "Philosophy-Free"?

There is little point in examining one or more possible philosophic approaches if common practice suggests that there can or should be none at all. Furthermore, this question of why there is at present so little relation between philosophy and educational research will probably be more useful to readers of the present issue of PHI DELTA KAPPAN than a more abstract consideration of what the various relations can or should be.

In part, the research worker in education seems to be hoping that he can avoid philosophy by making his research so scientific that it will be "philosophy-free" (to twist a phrase of Max Weber's). He looks enviously at natural scientists working within the established frameworks of their disciplines, apparently untroubled by philosophic issues, and hopes that he can do the same. This hope seems vain for several reasons.

First, one can question the reality of the phantasy that science is uniformly free of philosophic issues. The extent to which this may be true varies from science to science, and within any one science, from problem to problem. The chemist, it is true, can often turn out considerable quantities of worthwhile research without having to worry much about the fundamental concepts and methodology of his field. He may be able to operate within one generally accepted theoretical framework and the rather limited philosophic base it requires.

But the physiologist and to a still greater degree, the psychologist, are haunted by fundamental problems of a philosophic sort. Conflicting definitions of "organ" and "organism" as well as the disagreements of the Gestaltist with the connectionist are merely contemporary scientific manifestations of traditional philosophic problems. And in any one of these sciences, the theorist or the man engaged in so-called basic research trenches more closely on the boundaries of philosophy than does his "practical," or "applied," or "industrial" colleague.

Education as a Technology

In any event if the sciences are ordered in a hierarchy according to the degree to which they are "established," "mature," or "positive," and if education be considered a science, then certainly it comes near the bottom of the list. Good theoretical reasons exist for doubting whether this relative position can ever be improved, simply because of the nature of its traditional subject matter. Even if these reasons prove mistaken, at present the research worker in education cannot act like a chemist in search of a new synthetic. His field simply does not have an equally well established theoretical framework.

Perhaps education is best not considered a science at all, but rather a technology which, like medicine or engineering, utilizes various basic sciences in solving a particular class of problems. But even if considered as a technology, education cannot escape the philosophic incubus. The worker in education draws upon a great many sciences, and these sciences are extremely diverse. It is not an unusual educational problem which involves matters which basically are part of the subject matters of physiology, psychology, sociology, and political science (as well as of

ethics and religion, if these latter fields may be brought under "science" in its broadest sense). The educator, to handle his particular problem, must use the findings of all these sciences simultaneously. But because the sciences enumerated, as well as others, have followed rather independent lines of development from diverse starting points, their principles, postulates, and methodologies are often quite dissimilar.

Uses Least Mature Sciences

To affect adequate conciliation and congruence of their findings, the research worker in education needs a larger matrix than that provided by the conceptual framework of any one of these sciences. For if he attempts to reduce all these sciences to one of them, and, for example, to see sociology or ethics as mere extensions or parts of physiology, psychology, or mechanics, he immediately falls into familiar philosophic disputes about which is that one basic science to which all the others are to be reduced. In the search for a larger matrix which can contain them all yet which is more than a bed of Procrustes, the educator is driven toward some attempt at a comprehensive philosophic viewpoint. That he shows little evidence of this pressure at present seems to indicate that he handles his problems partially (i.e., within the limited framework of some one science) or produces his synthesis in an unsystematic, catch-as-catch-can fashion.

An additional complication in attempting a synthesis is the fact that the educationist makes greatest use of those sciences which are the least mature or positive. He has little to do with physics or chemistry where the dodging of philosophic issues without falling into triviality is usually easier. He draws most heavily upon sciences like psychology where the competing theories and conflicting modes of analysis are clearly linked with fundamental philosophic disagreements. In short, even as a technology education is forced into philosophizing when it attempts more than a superficial or partial treatment of its particular problems.

The most fundamental reason, however, why education cannot be as free from philosophy as some of the other sciences, appears to be the fact that it cannot be purely descriptive and predictive. It is, to use Bacon's word, operative. The educational process is an artificial, productive operation intended to bring about changes in students which are deemed desirable by somebody for some reason. Education as a field of study—be it science, a technology, or an art—works with that process. It does not produce descriptions or predictions concerning what is going to happen anyway; one of its chief problems is to decide what it wants to *make* happen.

Problem Cannot Be Ignored

The necessity for such choice confronts it with the general problem of value, a perplexity which many of the sciences can avoid. Education cannot. Precisely what the problem of value involves is, of course, another of those issues which immediately calls forth philosophic dispute. But the problem is there, and the educator works with it no more competently by ignoring it, dodging it, or smuggling his solutions in by the back door.

Some workers in education apparently do acknowledge the need for a fundamental philosophic framework within which to operate. But some of them fall into the trap of thinking they have one when they have not. One confusion of this kind arises from the fact that education as an operative enterprise demands group action. It requires concerted effort within and between assorted groups: students, parents, faculties, public officials, taxpayers and the like. Much educational research is connected and concerned with such joint operations and tends to take its coloration from this context. For concerted action, philosophic clarity is not essential.

Clarity a Definite Bar to Action

In fact, considerable evidence and opinion suggest that clarity of statement of principles and programs is a definite bar to mass action. The most familiar phenomena of this general sort are the platforms of major political parties. "Appeal to everybody and alienate nobody" is the principle on which such documents are composed. This result is best accomplished by use of the platitude, the vague generalization, the myth, and the symbol. Less vague and evasive statements would simply splinter majorities into warring minorities and destroy those broad coalitions which constitute our two-party system.

Education too has its programs for mass action. Like political platforms, these programs are for mothers, against sin, and strictly non-committal about anything more controversial. Attempts "to improve critical thinking" will always receive support if one is careful not to specify what that thinking is to be about or how it is to be done. "Respect for the human personality" is a most acceptable platitude if one stops short of advancing any reasons why human beings are proper objects of respect or of suggesting what this respect might involve in educational practice.

Platitudes Are Not Philosophies

These remarks are not a diatribe against "educational platforms," which are often as necessary as their political counterparts, and for the same reasons. The bad thing about such educational clichés from the standpoint of our present topic is that they are confused with what they are not. They are thought to constitute educational philosophies. People who would never regard a political platform as a treatise on political philosophy are only too prone to believe that educational platitudes and educational philosophy are synonymous. It is easy, though alarming, to conjecture the type of theoretic structure and the kind of research that would have been produced by the other sciences were their conceptual structures simply concatenations of the common truisms of those fields. Some educational research seems almost to have this sort of basis.

Those deceived by educational platforms are, however, not the only group which realizes the need for some kind of philosophic foundation and fails to achieve it. Limitations of space prevent even a complete enumeration of them, much less a detailed consideration. Some apparently feel that the fact of philosophic diversity casts doubt on the whole philosophic undertaking; hence they despair of the problem's ever being solved. Some seem to see the quest for philosophic precision as leading only to hair-splitting and logic-chopping; they apparently hope to find a solution elsewhere, though just where is not clear. Others shrink from the plurality and conflict inherent in taking account of these fundamental differences in point of view.

Little Philosophic Approach

For many reasons therefore, little of a philosophic approach is customarily made to educational research. Even Dewey's philosophy, which receives so much lip-service, is often in practice cut, pruned, perverted, and otherwise "improved." Whatever the reason, certain types of non-philosophic approach are familiar. The tiny superficial problem is popular because it is unconnected with anything important and hence anything that is likely to cause philosophic controversy. Or the educator whose field is educational psychology works like any other psychologist and piously hopes that someone else will tackle the problems inherent in "making the application to education." Or discordant doctrines are allegedly reconciled by having their edges chipped off; that they become disfigured as well as slippery in this process should surprise no one. Or because clear starting points, exact relations between fundamental terms, and sharp conclusions stir up disagreement, they are all made as vague and amorphous as possible; then no one can pin anything on the author. As a result, despite the spate of educational monographs, relatively few of them build solidly on preceding studies or can be built upon in their turn. Architecture is difficult when the bricks are made without straw.

Would Benefit Work in Education

In sum, any piece of educational research demands some basis or framework. When this framework becomes adequately precise, fundamental, and comprehensive, it tends to become what accurately may be called "philosophic." In the present state of philosophy (and quite possibly in all future states of it) universal agreement on a single theoretical framework is impossible. The philosophic approach will, therefore, involve a clarification and sharpening of fundamental philosophic disagreements as they appear in specific research efforts. But through this clarity, partial agreement would be strengthened, for coherent work could then be done on the basis of particular fundamental views. Prudence, expediency, and even hypocrisy could still operate as needed; but at least muddle-headedness would be reduced. Since this is one of the aims of research in any field, a more philosophic approach—a clearheaded variety of particular philosophic approaches—would benefit education.

For every student who now attends college or university there is at least one more equally able and anxious who cannot afford to attend.

Our New Dress

For those interested in the typographic details of our new "dress," here they are; Caledonia roman throughout, except as mentioned:

Text pages, 10 on 11 point; Keeping Abreast section, 9 on 10; subsidiary matter, 9 on 10 and 8 on 9; footnotes to tabular, 8 point; bibliography, 8 on 9; footnotes, 6 point; by-line, 11 point italics and roman caps; side-heads in text pages, 10 point bold; centered heads in text pages, 8 point bold caps; side-heads in S-R Bonds, and cut captions, 8 point bold; tabular captions, 8 point bold caps; summary paragraphs 10 on 13 point bold.

Main heads, 30 point Bodoni Modern. The cover title is hand-lettered, with Caledonia used for other cover copy.

Productive Techniques in Research

Research techniques in education may be classified as descriptive, metric, clinical, correlational, experimental, and theory construction or model building. Much descriptive research has been unproductive. General measurement research has been highly productive. Research of a clinical nature has done much for the improvement of education. While correlational techniques have been the basic methods of measurement, the more promising technique consists of various types of experimental methods. There are definite limits to which the best statistical methods may yield satisfactory results. Some are mentioned here.

By FRANCIS G. CORNELL*

THE TERM "technique" is considered here to mean specific procedures followed in the execution of some act. A catalogue of procedural details pursued in educational research in its half-century history would be encyclopedic —and probably not very useful. For example, we could describe and catalogue some 50 different "techniques" for determining the correlation between two variables. This, obviously, would be inappropriate, and we shall discuss procedural details *per se* very little. Instead, we shall try to present one view of the more general methods of attack, or research approaches, which appear, in the literature, to have been the most dominant.

From "Gadgetry" to Research Ends

No universal system of mutually exclusive and exhaustive categories for the classification of research-approaches will be established. That sort of thing, common in the "how-to-do-research" publications of pre-War II, seemed to lead nowhere. Moreover, it gave the fledgling graduate student the notion that once he had chosen a problem, all he had to do was to select, "cookbook" fashion, the appropriate technique, i.e., correlational, normative-survey, historical, experimental, etc.; "do a thesis" and win a degree.

In several of the multifarious areas of educational research there appears to be a shift from the "gadgetry" emphasis to the major purposes or ends of the research process. This certainly is not general, for the vast majority of educational literature seems doubtfully to pursue methods of science,[1] or any other orderly and logical approach, but not to stem from a theoretical or a conceptual frame which might lead to an advancement in knowledge.

Research Techniques Classified

The trend, however, is clear, particularly in the educational-psychological sphere. Indeed, the trend is not so much a trend in educational research-methodology as it is in the field of psychology, on which so much in education depends. Much research of a psychological variety in education is of the "theoretically derived" type. This is certainly true of research on learning and at least somewhat true in the general area of child study.[2] Any discussion, therefore, of research technique or research method should emphasize the emergence of systems of thought, which themselves define approaches to which specific techniques become subservient.

To catalogue current and past methods, however, much less sophisticated rubrics must be used. For our purposes, we shall discuss research technique in education under the following headings: (1) Descriptive, (2) Metric, (3) Clinical, (4) Correlational, and (5) Experimental. To this might be added a sixth, which would be those types of techniques which are theoretically derived and which consist of theory construction or model building and the verification of theoretical systems.[3] These developments are mostly for the future, however, and are the subject of the next article in this issue.

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DESCRIPTIVE METHODS

A good proportion of research in the past half century in education may be classed as "descriptive." In this category are all of the so-called normative and survey techniques. Much of this has been essential and important, but much of it has been painfully mundane and inconsequential. Among the useful contributions from the census-like enumerative studies in this category are the word-lists and word-counts made a generation ago. These provided a sound basis for improvement of instruction as well as improvement of textbooks and reading materials.

Fletcher H. Swift, among the earliest of scholars to study school finance, undertook historical descriptive studies of sources of revenue and methods of allocation and apportionment in the several states.[4] There is ample justification for such descriptive documentary research in early phases of research in an area. It is also important, in such fields as school finance, to have current and continuous "fact-getting" of essential data. Thus, the Office of Education and the Research Division of the NEA regularly assemble essential information and facts on the operation of educational programs in the 48 states. Tremendous advances have been made in techniques for the collection and statistical treatment of data.[5]

Much more information may be collected, and more efficiently, by virture of practical sample survey techniques now available to educational researchers who have had adequate statistical training.[6] With advances in techniques of measurement of attitudes, opinions, and the like, new and more dependable information is available to the educationist.[7]

An example of sampling in a national survey reported by Cornell[8] and an example of modern sample methods and opinon measurement in connection with a state reorganization program reported by Massanari[9] are two of several examples of progress in "scientific" descriptive research. But, much survey and descriptive research in education is repetitive and of doubtful value.[10]

METRIC METHODS

Since the spelling tests of Rice, literature dealing with the production of educational and psychological measures has become prolific. Recent publication of Gulliksen's *Theory of Mental Tests*,[11] and *Educational Measurement*[12] edited by Lindquist, bring together test development techniques and measurement theory evolved over the past half century.

Advances in psychometric methods have given us improved measures of general mental ability, aptitude, personality, and many other individual traits. Psychometric methods have been developed to assist in studying and diagnosing the interrelations of groups of persons. Projective techniques have supplemented older methods for studying personality characteristics of groups and individuals. Progress has been achieved in techniques of item preparation, item analysis, the determination of reliability, test validation, methods of scoring, and methods of scaling. Yet there are many unsolved difficulties in these areas. And there continue to be many aspects of human behavior of importance in learning and teaching not easily subjected to measurement.

"Foundation" Programs Based on Measurement

Though techniques of measurement which have developed in education are chiefly psychological, it is often overlooked that there has been considerable research on other types of measurement problems in the educational field. Examples are studies measuring population growth and forecasting population as a basis for planning school buildings, studies measuring the needs of various types of pupil stations in schoolhouse construction problems, and various measurement problems in the field of school finance. The uniquely American scheme of "foundation program" state aid to local districts was made possible only after studies which produced measures of educational need, measures of cost, the development of adequate cost units, and measures of taxpaying ability.[13]

Measurement Research Misused

Without question, measurement research in education has been productive. A good proportion of research work in education has been either the development of a test or a measure, or research on developing tests or measures. On the negative side, there has been much poor measuring in terms of presently available technical standards, and there has been much misuse in the application of tests. Moreover, measurement research has tended to expand horizontally. That is, we seem to do more and more research with more refined critiques or development of technique on specific phases of item analysis or reliability or homogeneity, rather than to advance to new theory or new measurement frontiers.

However, measurement studies appear to be more and more related to purpose. Yet the testing movement has been criticized because it emphasizes measurement for the sake of measurement. In a review of tests as research instruments by Thorndike, in the *Review of Educa-*

tional Research covering a three-year period, he stated that he had "not identified . . . any instances of especially noteworthy advance in test invention or in test theory."[14]

CLINICAL METHODS

There is a category of research involving almost all the techniques of descriptive methods, metric methods, and experimental methods, but which differs from other researches in that the primary emphasis is not on a population of subjects, i.e., pupils, teachers, classrooms, and school systems, but only on one or a very small number. These are usually intensive studies of individual cases. In general, therefore, the interest is "clinical" rather than "actuarial."

This, of course, involves all of the techniques of clinical psychology valuable in the field of educational guidance and counseling, and in individual child study. Of particular recent interest have been projective methods of psychodiagnosis. There has been considerable use of such instruments as the Rorschach Test, the Thematic Apperception Test, picture interpretation tests, and drawing tests. More objective methods such as inventories and questionnaires are used, as well as less systematic schemes of observation and recording. Among types of technique involved in intensive studies of individuals or groups are ratings, analysis of biographies, both directive and non-directive interviews, controlled systems of observation, analysis of writings, artistic productions, and other products of performance, recorded speech, specialized diary techniques and so on.[15]

"Case-Study" Types of Research

We use this category not simply because of the clinical psychological technique. There are large numbers of reports of experience (somewhat better than haphazardly documented) that someone has had in working with some behavioral aspects of a group of individuals in a classroom or in a school system. A good proportion of reports covered in the *Review of Educational Research* on many topics, such as, the elementary school curriculum, the teaching of various subjects, school budgets, the administration of teaching personnel, the financing of state school systems, and child behavior, are reports of experiences of individuals with individual cases. Some of these, like many studies in the descriptive or survey category, are difficult to assess, as purposes are not clear or techniques are not possible which permit generalizations to other situations even though masses of data are assembled.

This area should not, however, be ignored for there has clearly been a movement toward research in the actual situations of schools which does not suffer from the unreality and abstraction of the laboratory experiment. The school study council movement has been in this direction. The emphasis is upon action. Such research as is done, as a by-product of these programs, is of the "clinical" or "case-study" type.[16]

"Action Research" Defined

A recent term in the literature of educational research is "action research," defined by Corey as "research undertaken by practitioners in order that they may improve their practices."[17]

The techniques of action research are not especially unique. The distinction is in the motivation of the person doing the work, and in the substance for study. Actually the action research movement appears to be largely a campaign for more systematic evaluation and the applications of more rigorous methods to the improvement of actual operating situations of school systems. While the traditional researcher is interested only in finding an answer to a generalizable question, the action researcher is motivated to improve practices in an individual school situation.

Some studies in the "clinical" category are undertaken by those motivated in the traditional research sense, the motivation being that of studying the growth and development of individuals or groups by relating one or several variables to the variable of time, or to test hypotheses in the sense of the scientific experiment. There is undoubtedly a great deal of justification for such "one-trial experiments" for the simple reason that so little is known about so many aspects of education. Furthermore, large-scale experimental designs involving an adequate number of properly selected groups of students or schools systems is costly and beyond the scope of the resources available in educational research at the present time. The "case study" or "single-subject-experiment" is one of the alternatives to the researcher who wishes to study human phenomena in the totality of the real situation.

Trial and Error Experiments

This is the type of research which Greenwood in his classification of sociological experiments would call "the trial and error experiment,"[18] an experiment involving trying out something with a single person or group or institution. For instance, a teacher may "try out" (or she may say "conduct an experiment") by various methods of supplementing the textbook in a general science class for purposes of, she hopes, enhancing motivation and of broadening opportunities for learn-

ing, with achievement of outcomes not expected from the more or less assignment-study-recite method. She may systematically employ measurements at different periods during the course of the "experiment" in the single class. Scores on tests will reveal certain gains or absences of gain in measured outcome. Yet she will be unable to say how outcomes would have compared with outcomes had the same group been exposed to the conventional method, or many other possible types or method of instruction. Moreover, it will be impossible for her to attribute changes in pupils to specific causes. In other words, the "single-trial" may not be subjected to the "controls" of the factorial experiment discussed in the section below and in the following article.

However, many tryouts are being made with sufficiently sophisticated experimental design and sufficiently systematic evaluations so that considerable useful knowledge, either as an immediate guide to action or as a clue to future research, is forthcoming.[19]

CORRELATIONAL METHODS

As indicated in the introduction, it is difficult to find a scheme for mutually exclusive classification of research techniques used in education. The bundle of methodological tools, embracing techniques of correlation and multivariate analysis now to be discussed, illustrates the point. In almost any type of research or in almost any specialized research technique, there is some form of relating one phenomenon or variable to another phenomenon or variable. Even in general purpose, census-type survey-research, relationships are portrayed, for instance, between type of school and size of school, or between characteristics of the school population and location.

Even in the most useful of evidently non-statistical descriptive research, such as the so-called historical studies, "trends," contrasts, and comparisons are emphasized. All of these are techniques definable in statistical symbols of correlation. It should be noted also that correlation has been the handmaiden of measurement practice and theory.

"Correlation Bound" Until Recently

Without a doubt, techniques of correlation have permitted us to advance our knowledge about education considerably. On the other hand, it may be that this device has been a mixed blessing. There is some evidence that until recently educational research was somewhat "correlation bound." Long after the Fisherian view of chi-square had been available, for instance, educational literature, including textbooks in educational statistics, treated chi-square chiefly in connection with the Pearsonian coefficient of contingency, a sort of approximation to the correlation coefficient.

For sometime, a decade or two ago, educators used the partial correlation coefficient as if it were the answer to difficulties in designing properly controlled experiments. Multiple regression methods have been, and continue to be, useful in the handling of batteries of tests and in problems of prediction. Correlation, curve-fitting, and multiple regression methods have been strategic techniques in the measurement problems which opened up "scientific" school finance.

Factor Analysis Most Recent Method

Most recent of multivariate methods to assume importance in educational research is factor analysis. In general, factor methods permit an investigator with a matrix of inter-correlations of several variables to answer the question "what goes with what," in a manner which usually simplifies the number of "factors" which must be taken into account to explain phenomena.[20]

There are many variations in methods of factor analysis. There is considerable controversy as to which of several approaches is best and about conditions under which factor analysis is generally suitable. It has been pointed out that factor analysis methods may be used for (a) statistical description, (b) suggesting hypotheses, and (c) supporting or disproving hypotheses.[21] The chief difficulties of factor analytic methods are in (1) the variation of results with different sets of measures and with different sets of subjects, and (2) the subjective judgments involved on the part of those applying the techniques.

No Substitute for Careful Definition

In general, multivariate analysis methods are among the indispensable tools of educational research. There is a danger that they may be viewed over-enthusiastically as some form of research magic which will answer all problems. This is not true of any technique which is employed in education. Moreover, multivariate methods have the disadvantage that for some they become an easy escape from the difficult and onerous first step in research—that of careful definition of problems, so that purposes and objectives are clear and that *finally* techniques may be selected which are appropriate to the research goal of the investigator.

Correlation methods have tended to encourage the "shot-gun" approach to problems, a method by which variables are piled up and the investigator grinds figures to see what sense he can

make of his complex data. Such research is weak in theory or there is no very clear-cut problem. Instead it involves preoccupation with "numbers," often of doubtful validity and of doubtful educational significance.

EXPERIMENTAL METHODS

Fifteen or twenty years ago, the "single variable" experiment was a popular device for educational research. Pupils in an experimental class were "matched" on certain variables, such as achievement and intelligence and age, by a control group. The control group would be instructed in some subject, such as spelling, by the conventional method, and the experimental group would be instructed in the same subject by the experimental method. Gains in the two groups were then compared in the belief that they were identical or that conditions were controlled in all other respects. Observable differences were, therefore, attributed to the single variable of differences in method of instruction, and all of the evidence was based upon the tests or measures used as the dependent variable.[22]

There were several objections to this procedure. One of these was that a break from atomistic theories of education began to lead educators to ask more complex questions than could be answered in such a simple design. Another was that the design itself, in many respects, was inadequate statistically, since it actually failed to control many variables, such as the differences in motivations of teacher and pupils in the experimental group (the Hawthorne effect), and many other matters. Since the monumental contributions of Fisher,[23] there has been a vast accumulation of improvements in method of experimental design and statistical analysis, not available earlier in the century.[24] It is far beyond the scope of the present writing to discuss these advances in technique. [A further discussion of this subject is found in the following article by Johnson.] It is of interest to note, however, that the best references digesting them, other than that of the mathematical and biological sciences, may be found in psychological publications.[25]

Techniques Often Not Known

It is somewhat surprising that educational research has responded so slowly to the opportunities which efficient statistical methods make for the maximizing of information from experiments. In a recent three-year review of experimental methods in education, Norton and Lindquist[26] report little evidence that the typical research worker in education thoroughly understands the techniques he uses, or is familiar with recent developments in experimental methods. Indeed, there are limits to which we may expect even the best statistical methods to yield satisfactory experiments in education. A school or a community or a family in the complex of factors cannot be brought into a laboratory situation or selected according to the dictates of most sampling models in any manner which does not, to some extent, contaminate results. In this respect education shares a dilemma with the field of sociology, in which the "natural situation" experiment involving a rigged-up control has been dignified recently by the term "ex post facto experiment."[27] Despite objections to it, the experiment will undoubtedly continue as one of the most important techniques in educational research.

Experimentation Most Likely Hope

In dealing with human behavior, as Freud once put it, a man of science must bear uncertainty. Correlational techniques show us that we may expect thus and so concerning variable X if we have thus and so in variables Y and Z. Practitioners often err in interpreting such studies, as though student A, with a given intelligence test score, unquestionably will achieve in a certain way in school, or, since correlation is high between expenditure and quality of educational program, that if we spend more money we most assuredly shall get better education.

Experimental methods, likewise, are interpretable only in probabilistic terms. The experimental approach, however, at least where manipulation and control are possible, comes much closer to establishing cause and effect than does simple correlation.

All types covered in this review are essential and important in educational research. In the judgment of the writer, however, greater contributions to building a science of education may come from the rigorous methods of experimentation. I suspect that many questionnaire studies and many "psuedo experiments" are conducted simply because our economy has not been sold on supporting either the disciplined training of the research worker or the execution of studies stemming from clear-cut definition of objectives imbedded in a contest of theory, and utilizing efficient hypothesis-testing and verification.

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19. An example of the use of refined techniques in experiment limited administratively in opportunities for scientific control is a study by Carl W. Proehl. *An Experimental Study of the Effects of Two Patterns of Professional Education in the Preparation of Secondary School Teachers.* Doctor's thesis. Urbana, Ill.: University of Illinois, 1953. 156 p. (Typewritten).

20. For a recent review of this subject with a bibliography see John B. Carroll and Robert F. Schweiker. "Factor Analysis in Educational Research." *Review of Educational Research* 21: 368-82; Dec., 1951.

21. H. J. Eysenck. "The Logical Basis of Factor Analysis." *The American Psychologist* 8: 105-13; Mar., 1953.

22. For a brief survey see Francis G. Cornell and Walter S. Monroe. "Experiment." *Encyclopedia of Educational Research.* Revised edition. (Edited by Walter S. Monroe.) New York: The Macmillan Co., 1950. pp. 414-16.

23. R. A. Fisher. *Statistical Methods for Research Workers.* Eleventh edition. Edinburgh: Oliver and Boyd, Ltd., 1950. 356 p. See also R. A. Fisher. *The Design of Experiments.* Fifth edition. Edinburgh: Oliver and Boyd, Ltd., 1949. 242 p.

24. A recent treatment of this subject in one volume in the context of educational research is Everet F. Lindquist. *Design and Analysis of Experiments in Psychology and Education.* Boston: Houghton-Mifflin Co., 1953. 393 p.

25. See for instance chapters on "Statistical Theory and Research Design" by D. A. Grant, A. L. Edwards, and Q. McNemar, in the 1950, 1951, and 1952 volumes of the *Annual Review of Psychology.* op. cit.

26. Dee W. Norton and Everet F. Lindquist. "Applications of Experimental Design and Analysis." *Review of Educational Research* 21: 350-67; Dec., 1951.

27. F. S. Chapin. *Experimental Designs in Sociological Research.* New York: Harper and Brothers, 1941.

The implication for those who wish to assist the social sciences is to support the uncommitted investigator who has ideas, irrelevant as these ideas may seem to practical problems. The practical arts, including the art of human relations, are bound to progress, even if slowly, by trial-and-error methods; society is always ready to assist such undertakings. . . . In this century we have refined the process of trial-and-error experimentation; we have learned wisdom about empirical procedures. . . . A candid review of what has been accomplished in pedagogy, in handling some types of abnormal psychology, in a few restricted areas of economics, perhaps in certain kinds of human relations, would show progress and would demonstrate that we can solve certain types of problems involving human beings better than our ancestors.—James B. Conant.

Experience is the name everyone gives to mistakes.—Oscar Wilde.

Some Promising Newer Methods

Design and analysis are basic requirements in increasing scientific knowledge through experimentation and other forms of observation. Many problems in education are amenable to scientific experimentation. It is in this area that newer statistical methods are making their greatest contribution. Experimentation is the only method by which causality can be scientifically established. *Design* and *modeling* are the key words in experimental research. Methods are concerned with major ideas, principles, and conclusions. Techniques are concerned with tools and their application in getting facts, and in using them.

By PALMER O. JOHNSON*

WE MAY BEGIN by recalling Whitehead's apothegm: "A science which hesitates to forget its founders is lost." Although educational research has undergone some modification over the decades, it has not digressed, in general, from its early antecedents nor does it reflect changes in general research methodologies. Research workers in most fields seem to be isolationists and, too often, are satisfied to quote one another and to remain insensitive to changes that have taken place elsewhere.

Education by its very nature is affected by practically all disciplines, directly or indirectly, particularly by the sciences of man. In these sciences, the trend has been away from investigating a human problem from a single viewpoint only, and towards examining the human event from many points of view, simultaneously. The new approach clearly indicates the necessity for laboratory techniques and field methods of the required precision and penetration. To meet these requirements a sweeping re-examination and revision of traditional concepts has been necessary.

The Broader Trends in Research

Cooperative movements aimed at the analysis and synthesis of knowledge and represented by *The Institute for the Unity of Science* are guided by the thought that "the spirit, purpose, and essential logical and instrumental methodology of science can be applied more or less readily and successfully to any and every form and aspect of knowledge." In a similar vein, *The Foundation for Integrated Education* aims "to promote the free association of those working toward the integration of all knowledge through the study of the whole of things, nature, man, and society." It is not the purpose of this discussion to describe or analyze these broader movements. They do serve, however, as the background for the primary purpose of this paper, which is to present some of the newer methods and techniques of research, and their implications for elevating the quality and quantity of research in education. The broader scope of research methodology and techniques is in the direction of multi-dimensionality —from unifactor to multiple-factor experimentation and from univariate to multivariate analysis.

Modern Principles of Experimentation

We shall not attempt to maintain a distinction between methods and techniques although such a distinction exists. By techniques of research we refer to tools and their application, and by methods of research to the underlying logical principles of research procedure. Methods arrive or attempt to arrive at conclusions, techniques at facts. We shall also restrict our consideration to such aspects of the scientific method as deal with the collection and analysis of statistical data. We shall be concerned in the main with major ideas and principles and not with technical details.

In the modern conception of research, design and analysis are regarded as aspects of the same whole, namely, the logical requirements of the

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complete process of making genuine additions to scientific knowledge by experimentation and other forms of observational programs. To determine how observational data are to be analyzed it is first necessary to ascertain the conditions under which they are to be collected. Thus statistics must be brought into play in the advance planning stage of an investigation. Once the form of the analysis has been determined for the particular design, this form becomes the only appropriate technique of analysis to use.

Education is fortunate in that many of its problems of variability are amenable to scientific experimentation. It is here that the newer methods have made their greatest contribution, and it is only by the experimental method that causality can be scientifically established. The traditional method of experimentation is based upon a model designed primarily for the study of problems in the physical sciences. It established the procedure of varying only one circumstance at a time and of controlling all the other factors. Although this model served physics well, it was not appropriate for the materials in the biological and psychological sciences. Here the materials are themselves intrinsically variable and what was needed was a new model. This was furnished by R. A. Fisher, and was based on three fundamental principles: local control of variation, replication, and randomization.

Statistical Concepts Necessary

We observe in the experimental situation the inevitability of statistics. Since many types of measurement, in the biological sciences as well as in the physical, are not perfectly reproducible in repeated trials, it is often impossible to interpret numerical data without the use, either explicitly or implicity, of statistical concepts. It is possible in some cases to control variation by the selection of homogeneous groups for experimentation, but even when possible there is a definite disadvantage; it limits the applicability of the conclusions. By careful planning, a factorial design, for instance, may be chosen so as to permit estimation of components of variation from different sources. The measurement of variation is not antagonistic but complementary to its minimization; by its aid a wider basis for inductive reasoning from the experimental results is obtainable. Often groups of organisms or objects may respond differently to treatment-variants so that unless experiments are replicated over several groups, no assessment of the consistency of treatment-effects becomes possible. The objective of experimentation should be to discover the mechanism of cause and effect underlying all variation.

The unique contribution of R. A. Fisher to experimental inference was the introduction of the principle of randomization. A later use of this principle was the introduction of randomization tests for the interpretation of experimental results, both directly and as a means of establishing the validity of approximate tests with less administrative difficulty. The broad problem of statistical inference is the determination of the uncertainty of conclusions drawn from experimental or observational data. The theory of probability is fundamental in the attack upon this problem, by providing statements concerning the correctness of the conclusions drawn. Without the introduction of randomization there would be no validity to the application of the theory of probability.

Extracting Maximum Information

The theory of design of experiments aims to establish principles for collecting the primary data such that valid inferences may be drawn from them and for extracting the maximum amount of information contained in the data in the most efficient way.

Modern statistical science has repudiated the assumption that in order to apply the experimental method, the so-called "law of the single variable" must apply. It has demonstrated that through the application of the experimental principles, previously indicated, an experimental problem can be investigated when several variables are undergoing change. By means of the principles of design and the correspondingly appropriate techniques of the analysis of variance and covariance, it is possible to vary as many factors as may be regarded as important and still draw inferences applicable to "actual conditions."

Thus modern developments in the design and analysis of scientific experiment are of special significance in the social sciences, where it may be difficult or impossible to set up a "social laboratory." In education and psychology the possibilities of evaluating the complex problems encountered in the natural setting offer new promise to research in these fields. It is not implied that laboratory experiments should be abandoned, but that they in turn will take on new importance in identifying factors sufficiently promising to be combined in more comprehensive experiments designed to permit situational as well as populational generalizations.

The limits of generalization from experimental evidence provide an excellent basis for comparing the traditional, or "classical" experiment and

the modern multivariate type. The classical experiment traditionally employs a single valued function, with some tendency recently to use only a few carefully selected values of the stimulus variable. At times, the subjects of the experiment may be chosen at random as representative of a well-defined population. There may be, therefore, populational generality, with minimum statements of the form restricted to "specific conditions." The desideratum of the modern experimental design is that of attaining, in addition to a sample of subjects chosen as representative of the population, a sample of stimulus situations for which the conclusions are to be made.

Problem of Representative Sampling

Modern designs of experiments are particularly appropriate in those large scale cooperative experiments so much needed in education. By coordinating the researches of several different investigators in representative samples of schools, it becomes possible to secure not only information on the individual investigations but also the additional knowledge resulting from the combination. The application of modern designs can serve to detect the genuineness of discrepant results secured at different places, or at different times, and thus to recognize the limitations of generalizations that might otherwise be accepted uncritically.

Over the past twenty-five years or so, a large number of classes of experimental designs have been evolved. The basic experimental designs are but three: the completely randomized design, complete randomized blocks, and Latin squares. Most of the recent developments in the field are mainly specialized devices for specialized purposes, which do not depart in any fundamental way from the general principles of design specified. For example, a class of experimental designs has been devised for the purpose of obtaining patterns of observations which make use of natural groupings in the experimental material. By arranging the treatments so that the natural grouping (twins, for example) is used, it becomes possible to permit treatment contrasts on experimental units within the natural groups. In this arrangement it is possible to make comparisons usually with increased accuracy as compared to the situation where the experimenter is required to randomize the placements of the treatments with respect to these groupings.

Fractional Replication a Recent Device

One of the most important designs is the factorial. In this design all combinations of a set of factors may be included in the experiment. Such an experiment usually makes possible the attainment of precise estimates of the average effects of each factor since it contains internal replications. The design also makes it possible to determine if there are interactions among the effects of the different factors. When the number of factors is large, the number of combinations may exceed the experimental resources. The recent device of fractional replication makes possible an arrangement whereby only a fraction, e.g., one-half, or one-quarter, of the combinations required for a complete replication need actually be used in the experiment.

The concern of the experimenter is to plan his investigations so that the results lead to valid conclusions, reliably and economically. He proceeds in accordance with experimental principles to fit a specific design to a projected experiment. There are no general rules leading directly to the selection of designs. Each experimental situation presents its own problems. A practical working basis is to use the simplest design meeting best the needs of the experiment. This does not exclude the use of complex designs when these best serve the experimental purpose.

Sequential Experimentations

Sequential analysis was developed during World War II and has been used chiefly in various industrial applications, but it is beginning to be used in certain scientific investigations. This method analyzes data as it comes in as compared with the usual experiment in which the data are analyzed at the end. In this way, there may be an appreciable reduction in the amount of data required to reach statistically valid conclusions. The method may be considered as a series of experiments each one of which depends upon what has preceded it. A detailed procedure is laid down in advance indicating what action shall be taken in all cases. In this way the sequences attain the same unity as a single act of sampling.

Abraham Wald, who worked out the theoretical basis of sequential analysis, followed it up by a generalization leading to the theory of the decision function. The dichotomy of accepting or rejecting a hypothesis characterizing sequential analysis led to the broader problem of selecting one out of a plurality of possible actions on the basis of observations collected or to be collected. Consideration was given to the possible types of actions, the risks attached to each action, and the probabilities of the experimental data and statistical techniques leading to the various actions. Wald introduced a minimax principle

which had as its purpose the minimization of the expectation of the risk. This approach has had its chief use in the technical field involving the production and use of manufactured products.

One difficulty in the application of the decision function approach to the usual experimental situation is the specification of weights or risk functions for incorrect decisions. However, the influence of this approach to scientific investigation is already discernible in its effect on concepts underlying inductive logic as well as in its practical manifestations.

Information Theory

The concept of the quantity of information is fundamental to research workers. Every time a research worker takes an observation or conducts an experiment he is seeking information. The question arises as to how much information a particular set of observations or experiments contains. Three independent workers found need for an answer to this question in precise mathematical terms.

R. A. Fisher introduced the concept of the quantity of information into statistics. His motive in studying the subject was to compare the merits of different statistical estimates and later to determine the efficiency of one experimental design relative to another. Shannon's motivation was the problem of coding information and Wiener's, the problem of noise and message in electrical filters. In the latter situation the amount of information in a system is a measure of its degree of organization and the entropy of a system, a measure of the degree of disorganization. Thus one is simply the negative of the other.

The models underlying information theory are likely to prove very fruitful for a number of educational and psychological problems. Certain problems in learning, in intelligence and achievement test construction and analysis, and in scaling are especially appropriate for application.

Sampling Principles and Applications

The striking theoretical and technical advance leading to modern experimental designs produced a startling advance in the development of sampling designs and techniques. This development has much to offer educational research workers. The sampling problem is perhaps the most fundamental problem in practical statistics.

The planning of sampling designs is involved in both experimental investigations and sampling surveys, descriptive and analytical. The problem is that of securing accurate and representative samples of the population. Since the fundamental purpose of sampling is to obtain information about a population, the first matter of importance in either experimental or survey investigations is to specify clearly what the population is. Since it is impossible or impractical to investigate the entire population, the investigator examines a small part of it. On the basis of the information elicited from the sample, inferences are drawn for the whole population. Randomness is the property of a sample that makes possible the calculation of the probability of error of the inferences drawn. The theory of probability cannot be applied to a sample that is not randomly drawn. Hence, it is impossible to measure the degree of confidence to be placed in any inference drawn from a non-random sample.

We have previously pointed out the particularly difficult but all-important sampling problem. The task of the experimenter in education is to secure samples that are representative both populationally and ecologically. We can only report here a few developments in sampling theory and practice which, if applied, could elevate substantially the quality and scope of educational research. Our consideration will be given principally to the sampling survey.

Sampling Techniques and Sampling Errors

A guiding principle in modern sampling practice is to select the method of sampling that will give the desired precision as economically as possible. The degree of precision required will depend upon the purpose for which the survey results are to be used. No good purpose is served by a demand for unnecessarily high precision, while poor precision either diminishes the utility of the results or may make them useless. The precision is usually indicated by specifying the size of the standard error which the estimate may have. In deciding the size of sampling error attention must be given to other sources of error controllable or non-controllable. There is no point in achieving a small sampling error if other errors make the estimates imprecise.

The next problem is to estimate, for any sampling method considered for use, the size of the sample that is required to reduce the standard error of the estimate to the specified amount. An important contribution to the problem of estimating sample size has been made by Stein.[1] Briefly stated the process is this: The precision required is used to determine the pre-assigned confidence coefficient and the confidence interval. Two sets of observations are made. The first set

[1] Charles M. Stein, "Two-sample Test of a Linear Hypothesis Whose Power Is Independent of the Variance," *Annals of Math. Stat.*, 16:243-258; 1945.

of an arbitrary number $n_1 \geqq 2$ of observations

$$X_1, X_2, - - -, Xn_1$$

is obtained from these, an estimate s, is obtained of the population σ, and also a preliminary estimate of the mean μ. The results of these calculations determine the number $n_2 \geqq 1$ of observations

$$Xn_1 + 1, Xn_1 + 2, \ldots, Xn_1 + n_2$$

of the second set, needed to have the specified confidence interval. Then the two sets are combined to determine the confidence interval for the unknown mean μ of the normal distribution sampled.

Once the cost of obtaining the desired degree of precision has been estimated for each of the sampling methods that are under consideration, the basis is laid for selecting the method likely to cost the least.

The Problem of Non-Response

One further development of great importance relates to the problem of non-response. Unfortunately, any sizable percentage of non-response may ruin an otherwise carefully planned sampling design. If the difficulty is attributable to difficulty in contacting the respondent or to his unwillingness to cooperate, then, after a number of trials or methods have proved ineffective, another line of attack is to take a random sample of the non-responding cases and to exert every effort to obtain the information from them. Hansen and Hurwitz[2] have developed a method for determining the best size of this subsample. Their procedure is an application of the method of double sampling with stratification. The first, or large sample of size n, gives an estimate of the relative size of the non-respondents, n_1/n_2 : n_1 is the number of sampling units in the sample of n that respond and n_2, the number in the non-response group. The second or small sample is of size n_1 in the first stratum and of size n_2 in the second stratum. For each response rate, the minimum cost of the survey is calculated. From this calculation it becomes possible to determine the maximum number of questionnaires to be mailed independent of the response rate. Then to attain the desired precision, the number of cases to be interviewed would vary with the response rate actually found. Birnbaum and Sirken[3] have also devised a method of finding sample size when non-response exists. They have worked out relations showing the size of sample for the least favorable case of non-response, which still guarantees an error of less than a specified amount and with a designated risk. Convenient tables are provided for estimating the smallest value of sample size for given limits of error and at specified risks for different percentages of actual non-response.

Errors From Unsuspected Periodicity

Developments in systematic sampling are of importance to educational research workers, since samples are often chosen from rosters or frames of individuals, schools, or classes. The method often followed is as follows: The units in the population N are first numbered from 1 to N in some order. In order to select a sample of n units, the first entry from the first k units is determined at random, and thereafter every k-th subsequent unit is taken. Thus systematic samples are often easier to draw and to execute. The disadvantages are that poor precision may result from sample estimates when unsuspected periodicity exists in the population units tested, and that there is no formula of general validity for the sampling error of the estimate. However, when the ordering of the population is essentially random, e.g., sampling from a file arranged alphabetically by surnames, when the characteristic being investigated is independent of the surname of the individual, sample estimates of error that may be considered reasonably unbiased are available. Other situations for systematic sampling are discussed by Cochran.[4]

Cluster Sampling Extremely Valuable

Often in sampling school populations the class is the practical unit. The technical sampling unit is often referred to as a cluster. Cluster sampling almost always increases the sampling error as compared with unrestricted random sampling of individuals as observational units. Also, the sampling of groups may be considerably easier and cheaper than sampling of individuals. It may be pointed out that systematic sampling amounts essentially to the selection of a single complex sampling unit, which in this case makes up the whole sample.

Appropriate formulas must be used or developed for estimating the sampling error for cluster samples as for systematic samples. Most formulas that have been developed for the variance of the mean of a systematic sample would apply to any kind of cluster sampling in which the clusters are all comprised of n elements and the sample is constituted of one cluster. When the sampling

[2] Morris H. Hansen and William N. Hurwitz, "The Problem of Non-Response in Sample Surveys," *Journal of American Statistical Association*, 41:517-529; 1946.

[3] Z. W. Birnbaum and M. G. Sirken, "On the Total Error Due to Non-interview and to Random Samplings," *Int. Journal Opinion and Attitude Response*, 4:179-191; 1950.

[4] William G. Cochran, *Sampling Techniques*. New York: John Wiley and Sons, 1953, pp. 160-188.

unit is a cluster of elements, variance formulas for estimating sampling error are sometimes expressed in terms of the intra-class correlation coefficient between elements in the same cluster. Since cluster sampling is an extremely valuable method in educational research, it is necessary in using it to know the conditions and means by which statistical estimates and the measures of their sampling error may be ascertained.

Analysis of Variance Models

The introduction of the analysis-of-variance technique by R. A. Fisher for analyzing the results of experiments and sample surveys made possible the modern advances in experimental and sampling designs.

There are a number of different analysis of variance models. The model most commonly used and associated with the historical development of the technique is known as Model I. It is a parametric model. The types of problems for which this model provides solutions include the usual problems of estimation and tests of hypotheses to determine whether to infer the existence of true differences among "treatment" means, "variety" means, and "place" means. Problems of univariate and multivariate regression are also included in the same class.

Model II of the analysis of variance is used in the solution of problems involving the estimation of variances and testing of hypotheses about variances in the populations.[5] It is a random model. Model II has been particularly fruitful in its use in the solution of problems in quantitative genetics, in sampling problems, and it is beginning to play an important role in experiments and surveys. This method of variance component analysis should be of particular value in studying certain educational problems, such as components of variation in learning studies, desirable class sizes in relation to provision for individual differences, and in investigating components of variation in tests and ratings.

Moonan[6] has recently given the theoretical and analytical aspects of a methodology based on a direct multivariate generalization of the univariate analysis of variance. This technique makes possible the simultaneous analysis of multiple criteria in experimentation. An additional advantage accrues in overcoming the limitations of independent tests of significance in assigning exact probabilities of acceptance or rejection of hypotheses when such tests are applied successively to variates measured on the same experimental subjects.

Techniques of Classification

The development of methods of discriminant analysis open up new promise for the study of certain educational problems involving classification. Since its introduction in 1935 by R. A. Fisher, the linear discriminant function has been applied to a large variety of problems. The general problem of classification is a discrimination problem. Suppose that n_1 random individuals of one population have been measured on each of a number of characteristics and that n_2 random individuals of another population have been similarly measured. The problem of the discriminant function is: What linear combination of these measurements would discriminate best the members of one population from those of the other?

Later work on the discriminant function has extended the scope of this technique. Rao[7] has developed statistical criteria for classifying an individual as a member of one of many populations to which he can possibly belong. He also considered the problem of arriving at constellations of the groups themselves, making use of the generalized distance function developed by Mahalanobis.

The need for a discriminant function is also encountered in experimentation when several variables are used.[8] For example, in growth experiments different measurements of the experimental subject may be taken over a series of weeks. Here several concomitant variables are also measured and used in the analysis of the experimental results. By means of the analysis of covariance the independent variables are used to reduce the unaccountable variation in the dependent variables. Then the analysis of variance applied to the adjusted dependent variables is used jointly to derive the linear function of the corrected values, which is most highly sensitive to treatment differences. This is achieved by discriminant analysis.

[5] S. Lee Crump, "The Present Status of Variance Component Analysis," *Biometrics* 7:1-16; Mar., 1951.

[6] William J. Moonan, "The Generalization of the Principles of Modern Experimental Designs for Educational and Psychological Research," Ph.D. Thesis, University of Minnesota Library. 1953, 216 p.

[7] C. Radhakrishna Rao, "The Utilization of Multiple Measurements in Problems of Biological Classification," *Journal of the Royal Statistical Society, Series B.* 10:159-193; 1948.

[8] M. H. Quenouille, "Multivariate Experimentation," *Biometrics* 6:303-316; Sept., 1950.

To know what you know and what you don't know is the characteristic of one who knows.—Confucius.

"As I teach my pupils," said my teacher-friend, "I try to remember one oft-stated axiom: 'There is nothing so unequal as equal treatment of unequals.'"

The Role of the Research Specialist

The specialist in educational research has a number of functions to perform —as a guide in planning, designing, and conducting educational experimentation. He plays the role of educational psychologist, clinical psychologist, research and test technician, statistician, communicator and interpreter of research findings. The specialist is needed in colleges and universities and in public school systems. In both places the major function is to improve the educative process.

By J. WAYNE WRIGHTSTONE*

THE SPECIALIST in a bureau of educational research serves the schools in a variety of roles; in colleges and universities he contributes to educational research in a variety of ways. Thus the specialist acts as a guide in educational experimentation, helping his associates to identify, analyze and define problems that require systematic study, as well as helping them to formulate hypotheses to be tested, to collect and treat data, to draw conclusions, and to interpret the findings of experimentation.

A Man of Many Parts

As an educational psychologist, he studies more effective methods and conditions of instruction in the wide range of school subject matter. As a clinical psychologist, he studies the intellectual, social and emotional development of children and makes case studies of children. The specialist, as a research expert or research psychologist, contributes to the technical design of studies by the appropriate use of such methods as experimental-control groups, longitudinal growth studies, sampling surveys, or correlational analysis of data. As a test technician, he contributes to the construction, analysis and refinement of all types of tests and measures of psychological characteristics. As a statistician, he engages in a range of activities from simple analysis of test data to prediction of population trends by the use of parabolic curves or application of methods of factor analysis to educational and psychological data. He serves also as an interpreter of educational research findings by writing, speaking, and conferring. As a staff member in an educational research bureau, he may be called upon to serve as expert in several different roles.

As a Guide to Educational Experimentation

The principal basis for progress in education is experimentation. Such experimentation may involve a new method of teaching reading, language, mathematics, social studies, or the sciences. It may involve an appraisal of new techniques of administration or supervision in the schools—for example, using a group process for determining school policies. It may involve the development and evaluation of an integrated or core curriculum compared with a separate subject curriculum at the elementary or secondary school level.

Regardless of the specific purpose of an experiment, it is the role of the research technician to work cooperatively with school personnel in the design of the experiment, the collection and interpretation of the data, as well as in the application of the findings in practical situations. Application of findings from an experiment involves not only interpretation of technical matters, but also the problem of participating successfully with individuals and groups so that the results of experimentation can be incorporated into school policies and practices.

As Educational Psychologist

In the field of the psychology of learning, the educational psychologist contributes to the research upon which important instructional techniques and materials are founded. In the field of reading, for example, numerous studies have dealt with the factors that influence reading readiness, the value of phonetics, analysis of eye

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movements in silent reading, reading interest of boys and girls at various age or grade levels, and the factors involved in reading comprehension at various developmental levels. In arithmetic, likewise, educational psychologists have investigated such problems as the readiness of young children for number work, the relation of mental age to achievement, the stages of growth or development in learning mathematical concepts, and factors that contribute to problem solving. Studies in the use of visual aids in social studies or the use of laboratory demonstrations in science are illustrative of the many contributions that have been made to the psychology of learning at both the elementary and secondary school levels.

From the cumulative research in the psychology of learning, newer and improved methods and materials emanate. It is necessary only to glance at a modern textbook on the psychology of learning to determine the extent and the influence of research on present-day principles and practices of learning in any subject matter of the curriculum.

As Clinical Psychologist

Many of the studies and contributions in educational research have been made by clinical psychologists. The techniques of clinical psychology are particularly valuable in studies of intellectual and educational maladjustment, as well as in studies of emotional and social maladjustment. Case studies provide comprehensive data about the physical, mental, emotional, and social factors that influence behavior in growth and development of the individual. Frequently, the studies have shown a high incidence of overlap of emotional and social maladjustment with educational maladjustment. Since the causes of this complex interrelationship cannot be successfully studied by group tests and measures, individual tests of intelligence, individual tests of personality, interview and observational techniques are frequently applied by clinical psychologists.

From the case studies, many of the diagnostic and remedial procedures now used in education have emerged. Perhaps the most outstanding instances of such contributions are in the field of diagnostic and remedial instruction in reading and in arithmetic. Similar contributions have been made in improving the emotional and social adjustment of pupils through guidance clinics.

As Research Technician

The technical design and methodology used in research studies are the special contribution of the research technician or research psychologist. From this type of specialist have come such contributions to research technique or design as the use of experimental-control groups, the criteria for longitudinal growth studies or for follow-up studies, the principles of sampling used in surveys, and methods for correlational analysis of data. These research methods have been one basis for the scientific progress in education in past decades. Today, as in the past, research specialists are improving and refining the techniques or tools of research in order to evaluate more effectively the experimental practices and data from which conclusions are drawn.

As Test Technician

In educational and psychological research, the test technician has made notable contributions to the theory and practice of test construction and administration. Over the period of the past three decades, tests and measures have advanced from the status of infancy to that of young adulthood. In recent years, over sixty million tests were administered annually in schools throughout the nation. These include tests of intelligence, achievement, aptitude, attitude, interests and personality.

In the decade of the 1920's, tests of mental ability, or intelligence, and tests of achievement in the basic school subjects were constructed. During the decade of the 1930's, the specialist devised tests of attitudes, aptitudes, interests, and personality. The decade of the 1940's represented a period of improvement and refinement of tests and measures. This period was marked, also, by contributions from specialists to such technical aspects of tests as item analysis, methods and techniques of determining various types of reliability, methods of establishing various types of validity, and methods of expressing and interpreting test scores by means of grade norms, age norms, percentile norms, and standard scores.

As in the past, test technicians are currently contributing, through their research, new or improved tests for the measurement of psychological characteristics and new or improved methods of constructing and interpreting test results.

As a Statistician

In the field of educational research, a variety of statistical techniques contribute to the analysis of quantitative data. The application of statistics ranges from the use of such simple statistical methods as means, standard deviations and coefficients of correlation to the complicated formulae and procedures involved in factor analysis. In practical situations, statistical techniques and

principles are used to predict population trends, especially as these affect school enrollment.

In studies of the psychology of learning or comparison of instructional methods, specialists in statistics have contributed methods of analysis of variance and analysis of covariance as well as of factorial designs to aid in analyzing the data. In test construction and interpretation, newer statistical methods have made possible more efficient estimation of coefficients of reliability, test item validity, and units of measurement in norms. Factor analysis of test scores has aided in the identification of primary mental and personality characteristics.

The statistician has made other contributions to educational research. He has constructed statistical tables for easy reference of research workers. He has adapted punched card techniques for machine calculations and tabulations. He has developed and improved the techniques of random sampling, stratified sampling, and cluster sampling which are used by the educational research worker in studying characteristics of a sample population and generalizing for the total population.

As an Interpreter of Research Findings

One responsibility of a research specialist in education is to interpret the findings of studies so that they may be understood and used by his less specialized colleagues. It is essential, also, that the specialist prepare reports of studies he conducts so that they may be examined and used by his research colleagues. For purposes of translation into school practice, the specialist prepares reviews and summaries of research findings for easy reference by educators.

Publications of the American Educational Research Association are examples of reviews and summaries. The *Review of Educational Research*, issued periodically, provides useful reviews of pertinent research studies for the previous three year period in areas of education from psychology of learning school subjects to studies of school administration and supervision. The *Encyclopedia of Educational Research* is a handy reference for educators because it provides in relatively non-technical language a summary of what research has to say on hundreds of topics in education.

In the local situation, however, the specialist interprets his findings not only by reports, reviews, and summaries but also by speaking and conferring with other school personnel on the application of specific research findings to the present-day problems in the school. The research specialist prepares bulletins for the local schools on the findings of research in reading, arithmetic, social studies, or science. He arranges for conferences or workshops to discuss the results of a local research study or the result or application of a national or regional research study in the local schools. In person-to-person relationships with key personnel, the local research worker helps to shape policy and practices that may be applied to the everyday problems of the everyday teacher or supervisor.

As a Specialist in Educational Research

In colleges and universities, where specialization within relatively narrow fields is feasible, an individual may achieve expertness as an educational psychologist, clinical psychologist, research technician, test technician, or statistician. These specialists contribute most of the new techniques and methods to the theory and practice of educational research.

In a research bureau of a public school system, the research specialist plays the roles required by the local situation, the same individual performing a variety of functions. The following are some of the major functions:

He cooperates with other school personnel to make systematic and objective studies of such educational problems as incidental versus scheduled learning in spelling of words, homogeneous versus heterogeneous grouping of gifted pupils, and the comparative merits of alphabetical and hieroglyphic systems of shorthand.

On other occasions, the same research specialist in the public school system may be required to plan and supervise the administration of standardized tests for various subjects or courses of study. It is his responsibility to tabulate the test results and to report and interpret the findings of a test survey to other school personnel. In some instances, he may need to work with subject-matter specialists to construct tests or other evaluative instruments to meet local school needs.

In such activities as detailed studies of diagnostic and remedial learning in reading or mathematics, the research specialist may have to use the tools and techniques of the clinical psychologist. Such studies usually require the administration and interpretation of individual tests of intelligence and personality, as well as the use of observational and interview techniques.

Other functions usually assigned to the research bureau of a public school system are predicting school population trends and, occasionally, conducting surveys of public opinion on

educational issues. In both of these functions, the research specialist may have to assume the role of statistician.

In addition, the specialist in a public school system is the primary agent for communicating and interpreting research findings to the ultimate consumers—namely, teachers and supervisors. He performs this function by means of action research projects, publication of bulletins or newsletters, and conferences or workshops.

Because of the variety of roles he is asked to play in the educational research bureau of a public school system, the specialist rarely can afford to specialize further in a limited number of the functions previously described. In a large bureau, such as that in the City of New York, some degree of specialization can be realized. But in smaller communities, where only a few persons comprise the research bureau, the personnel must be prepared to assume a greater variety of roles.

There are a number of functions in educational research that must be discharged by the specialist in this field: those of guide in educational experimentation, educational psychologist, research technician, clinical psychologist, test technician, statistician, communicator and interpreter of research findings.

In a college or university, the research specialist has a greater opportunity for further specialization within the field. In a research bureau of a public school system, he is the general practitioner, applying the techniques, methods, and findings of his more specialized associates in educational research. The major function of all specialists in educational research is to improve the educative process experimentally by means of systematic and objective study of educational problems and practices.

IMPACT ON EDUCATION

(Concluded from page 20)

and teaching, however, must both play subordinate roles if research production is to be dominant.

3. Increased specialization, on the one hand, and increased integration of specialties, on the other hand, are twin objectives which seem necessary to meet the demands of educational research. Opportunities must be found to stress each of these conflicting approaches. Specialization seems most necessary in respect to the content and scope of the problem studied. The integration of various specialities appears most necessary with respect to the range of disciplines and research methodologies which are used in the study of the problem. Specialized knowledge of a problem may be gained through an integration of diversities in studying the problem. The combination of specialization and integration may be gained either through extraordinarily wide preparation by young research workers, or by the cooperative efforts of a team of scholars pursuing a single problem.

4. More attempts to achieve a purer application of scientific method seem necessary. The rougher types of operational or action research have an important place in the research scene, as do the descriptive studies and the vague, exploratory studies which are so frequent. However, the more classic, rigorous designs of research, coupled with the more classic, skeptical, scientific, attitudes of interpretation, deserve particular attention.

5. Dependence upon a permanent, professional corps of qualified research workers is implied in most of the foregoing recommendations. Teachers and administrators in the field, and graduate students in the universities, have their contributions to make. University staff members who have heavy loads of teaching, field service, or administrative work may also make valuable contributions to research. But these are the amateurs and the marginal workers. Major reliance for research production, and hence for a continuing impact of research in education, must be placed on those who have mastered the difficult intellectual processes of research and who are free to labor unceasingly in the scientific investigation of educational problems.

6. Larger sums of money will probably be made available if enough people become excited enough about more research. Expenditures will continue to be an excellent measure of cultural and institutional interest in research. Individual research workers will undoubtedly find that their contributions are dependent, in large part, on the willingness of some organization to purchase time and talent for research from them.

. . . Science represents the office of intelligence, in projection and control of new experiences, pursued systematically, intentionally, and on a scale due to freedom from limitations of habit. It is the sole instrumentality of conscious, as distinct from accidental, progress. And if its generality, its remoteness from individual conditions, confer upon it a certain technicality and aloofness, these qualities are very different from those of merely speculative theorizing. The latter are in permanent dislocation from practice; the former are temporarily detached for the sake of wider and freer application in later concrete action. There is a kind of idle theory which is antithetical to practice; but genuinely scientific theory falls within practice as the agency of its expansion and its direction to new possibilities. —John Dewey.

Ideas go booming through the world louder than cannon. Thoughts are mightier than armies. Principles have achieved more victories than horsemen and chariots.—W. M. Paxton.

Responsibility for More Functional Use

The educational leader has a unique responsibility in the diffusion of knowledge about research findings. This article presents some of the problems which often militate against effective interpretation in the use of research in education. Educational leaders and their staffs must somehow find more time from the pressures of their jobs to discover what research has to offer, if not to find ways of doing original investigations themselves.

By HAROLD G. SHANE*

THE EFFORTS of educators to transfuse the implications of research into the bloodstream of educational practice have rarely been consistent and successful. Yet it is one of the important responsibilities of the educational leader to make an intelligent, active effort to insure that research findings are studied and used in the continuing process of improving the educational environment of children and youth.

Some of the problems which seem to militate against a more functional interpretation and use of research in education will be examined. An attempt will also be made to suggest a few of the ways in which educational leaders may hope to reduce the gap between what the schools are actually doing and what they might do if they would but make greater, more functional use of knowledge in the constantly growing storehouse of educational research.

The Problem of Values in Research

An important challenge to leadership in any efforts made to use research more adequately is related to educational values. Unlike impersonal research, such as in the fields of chemistry or physics where *things* are dealt with, educational research, because of its concern with organic children, is permeated with the complexity of the values which motivate it. "Good" research must be based upon values which promise to serve the welfare of children and youth in particular and society in general. But what is "good"?

There are those who feel deeply that the major function of the school is the effective transmission of subject matter. Others emphasize wholesome child development or the role of the school in transforming society. Granted that the soundness of the values that motivate it are essential to "good" educational research, before research findings can be put to functional use the assumption that they actually do or will support the attainment of socially desirable educational goals must be carefully and thoughtfully examined.[1]

The Philosophical Viewpoint and Research

This problem is so closely akin to the problem of values that it should, perhaps, be considered a part thereof. One's values determine his educational philosophy. By the same token, the research in which one engages and the interpretations he elects to make of the findings are colored by philosophy. Likewise, the research by which a teacher or administrator is influenced is likely to be governed by his philosophy.

Brameld[2] has classified current philosophical "schools" under the labels perennialist, essentialist, progressive, and social reconstructionist. These terms serve as well as any others to suggest the wide range of views, often in outright conflict, which influence the educator seeking to make functional use of research. Likewise, the researcher himself, consciously or unconsciously, has the wellsprings of *his* behavior in one philosophical stratum or another. The problem, simply stated, is this: before utilizing research more functionally the educator first must have a reasonably clear idea of the philosophy most con-

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[1] For a summary of the problem of values in education see chapters II through IV in Harold G. Shane and E. T. McSwain, *Evaluation and the Elementary Curriculum*. New York: Henry Holt and Company, 1951, pp. 23-101.

[2] Theodore Brameld, *Patterns of Educational Philosophy*. New York: World Book Company, 1950. Cf. chap. I.

sistent with his values. Lacking such a viewpoint he cannot evaluate adequately the merit of research, let alone put it to functional use.

The Problem of Intangibles in Research

Educational investigations, already complicated by conflicting philosophies, are further impeded by the fact that they inevitably must concern themselves with certain intangibles of human development. For example, research concerned with class size or teacher-pupil ratio has suggested that children learn facts in larger classes about as well as in smaller classes, particularly in the case of bright children.[3] Apparently children often *do* acquire information reasonably well when class size moves upward to, say, a 40-to-one teacher-pupil ratio. Yet it is fallacious to assume that rather large classes are, therefore, just as effective a setting for a child's total development as are small classes.

There is a great deal more to developing children by the educative process than merely imparting knowledge. How well is each boy or girl learning to live effectively with others? How is the school contributing to the child's value patterns which will determine to what use he is putting the academic learnings encouraged by the school? Too frequently, questions such as these are neglected by research in, for example, class size. If educational leadership is to make intelligent use of research, findings must be examined and interpreted in a broad context. The leader must ascertain whether a particular research conclusion respecting some special field or topic is an intelligent one, when the general welfare of children is considered.

The Problem of "Controlled" Research

Many investigations in educational fields are made under special circumstances. Often these are so-called "controlled experiments" in which a particular group of children under a particular combination of circumstances are studied. When the data are processed and certain conclusions reached does it necessarily follow that the findings are more or less uniformly applicable in other school situations? Because Mary Doe found that a given procedure helped her groups to excell in spelling will her procedures be equally effective if applied elsewhere? Actually, every child and every group is unique. Every situation which is related to the learning process is unique. Procedures and methods may be applicable to more than one group, but not necessarily.

[3] Henry J. Otto, "Class Size," *Encyclopedia of Educational Research*. New York: The Macmillan Company, 1950, p. 215.

The implication for educational leadership seeking to use research seems clear. When considering experiments done elsewhere, one should ascertain whether or not the "controls" used were so developed that they preclude application of the findings under circumstances other than those unique to the experiment. One frequent sign of inconclusive research is the excessive use of qualifying words and phrases which sometimes reduce "findings" to little more than educated guesses, often unrecognized as such.

The Interdisciplinary Problem

Of recent years educational writers have stressed, quite properly, the importance of researches in various disciplines which have a bearing on the field of education.[4] Anthropology, psychology, pediatrics, sociology, and so on, are cited as areas with which the alert educational leader presumably should be familiar. The basic idea here unquestionably is sound—but it creates a serious problem. How is the educational leader to ascertain who are authoritative writers in disciplines supplying bodies of research bearing on education? Years of preparation and experience in education enable the school worker to develop a reasonable acquaintance with the valid, reliable studies in his field, but he is likely to be naive or misled when he attempts to explore and to interpret research outside his specialty. Apparently, there is a need for broadening professional preparation to include at least an introduction to authoritative work (as in social psychology or anthropology) if workers in education are to have a reasonable acquaintance with other and complementary disciplines.

Lack of Follow-up Studies

Hollis Caswell has noted[5] that a majority of research workers fail to carry through studies of promise which they had once initiated in various areas of the curriculum. He attributed this, in part, to the infinitesimal portion of college of education budgets devoted to research activities. Obviously, lack of follow-up in research creates a handicap. The educational leader seeking to apply promising findings may find himself attempting to follow a road which has not been completed and ends in "recommendations for further study" which were left unheeded. Far from being hopeless, this situation should place educational leadership on its mettle to invest

[4] Cf. Chapter XII in *The American Elementary School*, 1953 Yearbook of The John Dewey Society. New York: Harper and Brothers, 1953, for a first-rate treatment of research in related disciplines which have implications for education.

[5] In an address to the 1951 Research Conference sponsored by the Association for Supervision and Curriculum Development, held at Northwestern University.

more time, energy, and money in ideas of promise lest they die out from lack of attention.

The Semantic Problem

Many professional fields such as law, medicine, and education have created special languages which are often used with poor semantic judgment, even by the initiate. Indeed, a vocabulary freighted with special terms and connotations seems to be one of the characteristics of a profession. Such at least is the contention of Mario Pei in a chapter on "Slang, Jargon, and Cant" in his *The Story of Language*. "Educators thrive," he reminds the reader, "on a diet of 'integration,' 'correlation,' and 'motivation'!"[6]

Pei's views call to mind the difficulty faced by the educator seeking to make more functional use of research: what *is* the "meaning of meaning" in the vocabulary of research? For example, what distinctions exist among such terms as action research, cooperative research, service research, and functional research? The adjectives used above to modify the noun, research, are employed frequently in current writings, but what fine lines may be drawn to distinguish each from the other? There is an important task ahead for educators who are willing to make the needed effort to simplify and improve our communication skills in education as a whole and in research in particular. While there are no commonplace synonyms for such terms as *correlate* or *integrate*, more simple, precise communication needs be stressed so that meaning is facilitated, not hampered, by expressions adopted by the profession.

The Inexperienced Personnel Problem

In any treatment of the question of how educators can make more functional use of research it is necessary to refer to the difficulties created by personnel problems. Meagre preparation, limited experience, and rapid turnover, especially at the elementary school level, have vexed education for many years. It is particularly important for the mature leader, in his associations with the staff, to help in the planning of in-service education experiences which will: (1) assist teachers to recognize the importance of research, (2) learn how to apply research findings to their work with children, (3) use research in long-range curriculum development programs, and (4) initiate research studies on a classroom or school-wide basis.

The Time Problem

Expanding enrollments, criticisms of education, and the addition of new subject matter and experiences to the curriculum have created a heavy physical and psychological load for school workers in every type of position. Many teachers and administrators feel pressed and even harassed by their current responsibilities. As a result they shy away from any significant research activity because there is "too little time to do anything more than we're doing now." Leadership in education probably needs to recognize the problem of pressures and, in all fairness, to seek to reduce some of the load now borne by many staffs. This is particularly true if teachers are to be expected to make more of a study of what research suggests for their work, let alone initiate original investigations with children.

"Next Steps" for Leadership

The list of problems above serves as a basis for the several summarizing points below. These pertain to the question of what leadership in education can do to make more functional use of research. It will be noted that no magic formula is proposed: the following is merely a collection of common-sense suggestions.

Making More Functional Use of Research

(1) Leadership should acquire a sense of direction based upon clarified values: a perspective of what good education *should* and *can* do.

(2) The values of the leader needs be expressed in a philosophy pointing to desirable social and educational goals and to ways of selecting, from among the researches available, those findings which suggest how school experiences can facilitate the development of children toward wholesome, adult maturity.

(3) Leadership should be sensitive to the fact that human beings are organic, that behavior involves many intangibles, and that research data are to be analyzed in a broad context of human development rather than in terms of isolated learnings.

(4) It must be realized that *groups* of children and *individual* children are unique and that research data compiled in one situation (however carefully "controlled" it may have been) often must be interpreted and applied with caution and good judgment when utilized elsewhere.

(5) Leadership should continue to study research contributions from other disciplines. But it must, at the same time, make more thorough efforts to examine the original reports rather than mere abstracts, and to develop greater sensitivity to what is genuinely authoritative in such fields as sociology, anthropology, or psychology.

(6) Leadership will need to face frankly the fact that many researches, due to limitations of time,

[6] Mario Pei, *The Story of Language*. New York: J. B. Lippincott Company, 1949, p. 177.

[7] For a provocative treatment of confused meanings clustered about the "action research concept" cf. Kimball Wiles, "Can We Sharpen the Concept of Action Research?" *Educational Leadership*, 10:408 ff., Apr., 1953. Wiles suggests that action research is essentially an application of the evaluative process.

funds, and similar conditions, have not been carried to a point at which they may be deemed conclusive. There is a great opportunity here for individual initiative in following up research which has been curtailed prematurely.

(7) Confusion in terminology should be reduced by more careful probing of the meaning of professional jargon. There has been too much coining of "loaded" words and phrases which confuse even the seasoned educational leader.

(8) Efforts must be made to approach the use of research data at the levels of understanding appropriate to a given school faculty. Many teachers will profit from simple in-service studies of research and its meanings.[8]

(9) Time must be found in public education both for the study of research findings, and for more and better research in local school districts. The pressures which bear upon administrators and teachers alike should be studied and alleviated so that there is a more adequate opportunity for personally and professionally rewarding experience in self-improvement through research.

[8] The 1952 pamphlet, "What Does Research Say About Arithmetic?" is a promising in-service aid. It was published by the Association for Supervision and Curriculum Development, NEA, 1201 16th St. N.W., Washington 6, D. C. The price: 50c.

RESEARCH AND THE GOOD LIFE

. . . Research means simply *Men Thinking*. Research is a substructure on which we try to erect other values, hoping that these values will be sustained and will lead to the good life, however defined. This good life to which, I believe, research can make a steady contribution is made up of a few basic elements:

1. The ability to do straight thinking, resisting when necessary all emotional distortion and drawing upon deep sources of knowledge.
2. The ability to improve the self—physically, socially and spiritually.
3. The ability to develop cooperative human values as shown in brotherhood and a reverence for life and to accept the responsibilities indicated.
4. The ability to enrich life through creative work and through enjoyment of the fine arts.

In short, if we define personality, art and religion in sufficiently high terms, we can round out our concept of what life should be and we can show the relation of educational methods and inquiries to such a life. It may be unreasonable to ask the individual researcher to think while in the lower depths of his thesis, but it is reasonable to give him, prior to such preoccupation, the cultural experience that would make him truly liberal and humane. Given this background in the researcher seen as a person, we may be confident—let us say at the 5 per cent level—that he will develop the ideas that transcend research. In education, as in religion, meaningfulness must be found in relation to what lies in the future.—George D. Stoddard.

The liberal tradition is the tradition of individual freedom and is based upon belief in reason. At the present time there are terrific forces combatting and undermining our concept of personal freedom. For example, we are being called upon to build a mighty military organization with which to meet aggression wherever it appears to threaten the peace of the world, and while armed might is necessary, we must never forget that a military organization demands the strictest obedience and is therefore basically authoritarian. Our quandary is real, for militarism and liberalism make uneasy bedfellows and we can protect the latter only by understanding that we are making a conscious, voluntary decision, a reassertion of our personal freedom in choosing this course.—Sarah Gibson Blanding.

We ask at least four things of education today. First, we wish it to preserve our cultural heritage and to instruct our children in their past; secondly, we want it to train them to live successfully and effectively in the world today, and this I presume must include the courage to face an uncertain and dangerous future; thirdly, we want them to be able to work for the improvement not only of their own lot but of their country and the world; and, finally, we want to train young people to be able to create wholesome relationships with others and to behave in a humane manner.—James Marshall.

Just the minute you get satisfied with what you've got, the concrete has begun to harden in your head. —Charles F. Kettering.

"That Research Project in Medieval History Is Getting Rather Out of Hand."
—Adapted from *The Schoolmaster* (London).

Resources for Educational Research

Potential resources for educational research in the United States are tremendous. If you want to put research into use, where do you go to find it? This article describes the various forms of such resources, facilities and services offered by libraries, literature, organizations, institutions. Often overlooked are the human resources of the profession at large and of Phi Delta Kappa in particular.

By CARTER V. GOOD*

MAJOR ADVANCES in resources for educational research and in library services and guides were made during the second quarter of the Twentieth Century. With respect to trends in library reference services, the next step is in the direction of cooperation, as reflected in the formation and expansion of regional union catalogues and bibliographic centers, and in organization of cooperative storage libraries for infrequently used research materials.[1] It has even been suggested that one approach to successful housing and use of the tremendous volume of library materials may be through an "automatic electronic library," to which the researcher could refer by remote control, utilizing a recording of the document and a wire communication network to "play" the record by remote control over a loud speaker or an automatic typewriter, anywhere.[2]

An even broader concept of library services emphasizes the fact that international understanding is based on free interchange of the cultural records of nations as collected and preserved by libraries, educational institutions, and other cultural organizations. International exchange of resources involves a number of possibilities and problems, such as: (a) exchange between institutions; (b) exchange of government publications; (c) national bibliography; (d) reproduction of research materials; (e) coordination of book acquisitions; (f) reconstruction of foreign libraries; (g) copyright, tariff, and postal regulations; (h) translations; (i) exhibits; and (j) interchange of personnel.[3]

With respect to the efforts of scholars and scientists, the chief aims of international scientific cooperation are: exchange of information, attainment of objectives which scientists of a single institution or nation cannot accomplish alone, and development of an *esprit de corps* which may counteract some of the evils of international politics. The means by which these aims may be approached include: (a) various forms of cooperative research; (b) international conferences and congresses; (c) activities of international commissions and committees responsible for the solution of specific problems; (d) personal contacts, visits, and correspondence; (e) exchange of research materials, specimens, and literature; (f) exchange of professors, research workers, and students; and (g) various publications (for example, scientific journals, abstracting journals, textbooks, reference books, popular books and journals, directories, bibliographies, indexes).[4]

Resources in the Educational Literature

Helpful guides to library usage and to reference books can be employed as keys to the large volume of literature that has appeared during the past quarter of a century or more. Especially valuable are: *How to Locate Educational Information and Data,*[5] and *Guide to Reference Books.*[6]

The most important index for workers in education is the *Education Index,* which began publication in January, 1929. It seeks to list all educational books published in the United States, with the exception of elementary and high-school textbooks; all articles in a large number of the important educational journals; additional educational articles in certain non-educational periodicals; and many monographs, bulletins, reports, book reviews, courses of study, and state documents in the field of education.

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The *Encyclopedia of Educational Research*[7] is the starting point for locating summarizing articles on the various problems and fields of education. It can be brought up to date by examining the *Review of Educational Research*, which began publication in January, 1931, and covers a variety of research materials, even a limited number of unpublished graduate theses. As a rule, it has included fifteen major subdivisions of education within a three-year cycle.

The *Dictionary of Education*,[8] as well as more specialized dictionaries in limited areas, is helpful as a means of orientation, although a dictionary definition of fifty words or less cannot deal with the literature and concepts in the manner of an encyclopedia.

Beginning with the titles of 1912, the Library of Congress printed an annual volume of published Doctors' dissertations in all fields.[9] The last number appeared in 1940 and covered 1938. Since this publication was usually two years late and omitted unpublished dissertations, another agency began a complete annual listing[10] with the titles of 1933-34.

Doctors' dissertations under way in education were listed annually in the January *Journal of Educational Research*, 1931-1946, and subsequently similar lists appeared in PHI DELTA KAPPAN.[11]

Many graduate institutions now publish volumes of abstracts or lists of theses, usually representing all the graduate work of the university, but sometimes devoted to summaries or lists of the theses of a given department. A basic guide to such summaries and lists of theses[12] is available, while an older source may prove helpful.

At times, higher institutions have not been too careful in the housing and cataloguing of dissertations and theses, particularly the older studies. John Dewey's doctoral dissertation (1884) at Johns Hopkins University, on the psychology of Kant, was never published and no copy is available, since the Johns Hopkins library did not preserve the manuscript.[13]

The most widely used educational directory, probably, is that issued annually in four parts by the United States Office of Education: (1) state and county school officers, (2) city school officers, (3) colleges and universities, and (4) educational associations and directories.[14]

Education, psychology, and social science are well equipped with directories and statistical and current events yearbooks. The annual educational directory published by the Office of Education includes useful information concerning educational and social science directories and yearbooks, as well as a compilation of educational, civic, and learned associations with an interest in education, in the United States. Extensive handbooks[15] list the scientific, learned, and technical organizations of the United States, Canada, and Great Britain.

Resources in the Psychological Literature

Many of the educational guides cover a considerable amount of psychological research. In fact, there are certain areas where it is difficult, if not impossible, to draw a sharp line between the two disciplines; for example, learning and conditioning, personality and character, vocational guidance, mental tests, or childhood and adolescence. Therefore, for selected topics the student of psychology may find pertinent information in the previously described educational guides, including the *Encyclopedia of Educational Research*, *Education Index*, and *Review of Educational Research*. There are times when the investigator, even with concentration of study in a particular field, may find it desirable to use the several guides in education, psychology, and social science.

The major comprehensive guide to the literature of psychology is the monthly journal, *Psychological Abstracts*,[16] founded in 1927. An extra number published in December contains the author and subject index for the year; it includes a list of current bibliographic sources. For the period from 1927 to 1936, at the end of which the *Psychological Index*[17] (established in 1895) suspended publication, the two journals performed an overlapping service. As the titles of the publications indicate, one includes abstracts or brief summaries, while the other is merely an index or list of references. For the years prior to 1927, the *Psychological Index* is the only major comprehensive available guide for psychological literature.

The *Annual Review of Psychology*[18] provides periodic summaries of contemporary psychological literature, with two major purposes: to cover publications considered noteworthy, and to emphasize an interpretative and evaluative approach to the literature.

Psychology is well equipped with dictionaries,[19] which perform an orientation function in the interpretation of psychological terms, concepts, principles, and procedures.

Organized Research in Education

Organized research, on a national and an international basis, owes much to the philanthropic foundations. Educational, psychological, and social inquiry has been advanced through en-

dowments for colleges and universities, fellowships, exchange lectureships, research subsidies to institutions and to individual investigators, and through studies and publications sponsored by the foundations themselves. An earlier review by Hollis[20] and a more recent survey by Flexner[21] provide excellent background concerning the policies and grants of the philanthropic foundations. The foundations especially pertinent to the present discussion include: Carnegie Corporation of New York, Carnegie Foundation for the Advancement of Teaching, Ford Foundation, General Education Board, Kellogg Foundation, and Rockefeller Foundation. A list of the foundations, their addresses and officers, is available in the annual educational directory of the U. S. Office of Education. As a rule, the annual reports of these organizations include descriptions of the publications, projects, and activities completed during the preceding year, as well as investigations under way.

The American Council on Education is one of the most active organizations in the sponsorship and supervision of large-scale and cooperative studies, and in disbursing research grants from the foundations, governmental agencies, and other sources. In addition to the functions of research and deliberation, the Council provides services through its publication program, through consultation, and by leadership in national groups which formulate educational policy. The investigations, activities, and history of the Council are fully described in certain of its publications.[22]

The large-scale and varied activities of the U. S. Office of Education are summarized in numerous bulletins and in the annual reports of the Commissioner of Education. The services of the Office of Education are chiefly research, informational, advisory, consultative, and promotional. This governmental agency has produced an enormous amount of research and statistical material of the highest value to our school systems and to the public.

The National Education Association, through its Research Division, has provided valuable leadership in four areas (research, informational, editorial and consultative, and administrative). These activities, including publications and yearbooks, are described in bulletins of the NEA.[23]

Significant research materials have been produced by the research agencies of state departments of education (for example, the state of New York), state education associations, city school systems (for example, Baltimore, New York City, and Philadelphia), and higher institutions (for example, Ohio State[24] and Illinois).

A number of higher institutions have been receiving large research grants from military and other governmental agencies. Reference has already been made to the individual research efforts of graduate students in meeting the requirements for degrees.

Cooperation and Action Research

Members of the profession at large, especially Phi Delta Kappans, constitute a tremendously important resource in the solution of a variety of practical problems in curriculum development, instructional methods, evaluation of outcomes, school organization, and community relations, through research. During the past few years, participation in problem-solving has received considerable attention in the educational, psychological, and social science literature, and may be regarded as a phase of the development of group dynamics (a movement initiated by Kurt Lewin and today emphasized especially in the research center at the University of Michigan). Several terms have been employed to identify the application of principles of group dynamics to the implementation of research findings, including such labels as action research, educational engineering, and operational research.

The social psychology of action-research programs is based on the concept of bringing about change step-by-step through group participation. In the early stage of the project, the role of observer separates study of the problem from possible fear of any change that may be required by the findings. In later stages of the action program, participation as a group identifies the individual members with the project and develops attitudes or behavior favorable to approval and support by way of implementation or application of the findings. Identification of staff members of a school system or of participating members from other groups with a particular investigational project is one of the strongest forces for applying in practice the results of research. The major emphases in action research, as discussed in the recent literature, may be summarized, with some risk of repetition, as follows:

1. Motivation usually stemming from an urgent practical or felt need, with a goal of application of results and improvement of practice in the particular setting where the group or investigator works, through processes of group planning, execution, and evaluation (by both research specialists and volunteer or lay participants).
2. Interest in the particular subjects investigated rather than in the total theoretical population represented by the sample under study.
3. A developmental design, with the hypothesis

and method subject to modification during the course of the action program, and with due consideration of all interdependent groups concerned in any changes to be made.

4. Desirability of training in concepts of group dynamics as background for cooperative study of practical problems, the guiding theory being that of human interaction by which change is either facilitated or resisted; and with frequent possibilities of interaction with the particular community by way of choice of problem areas, specific formulation of the problem, selection of procedures, presentation of findings, and application to practices. The scientists or scholars, in their role of democratic leaders, stimulate and develop the talents of the group, and train and supervise the participants in the project.

5. Determination of the value of the action project by the extent to which methods and findings make possible improvement in practice and a realization of social and educational purposes.

Phi Delta Kappans are in especially strategic positions to give leadership in applying the results of research to the solution of practical problems in the field. By virtue of training and experience they can render outstanding service in programs of action research.

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Prejudice is not held against people because they have evil qualities. Evil qualities are imputed to people because prejudices are held against them.—Marshall Wingfield.

There is one thing stronger than all the armies in the world, and that is an IDEA whose time has come.—Victor Hugo.

Some Questions Laymen Ask

The questions laymen ask about education constitute a considerable portion of the questions amenable to study by the best-known processes available to educational research. The author is chairman of the National Citizens' Commission for the Public Schools, and presents, briefly, what his organization is attempting to do to help citizens find answers to such questions. These questions should be answered carefully, candidly, and completely, or they become the first step in misunderstanding. Implicit is the responsibility of citizens and professional educators, alike, to keep abreast of findings of research in their search for the answers to education's perplexing problems. Through research we learn.

By ROY E. LARSEN

NOT LONG AGO, a business associate of mine had occasion to address his fellow members of the Parent-Teachers Association of the community in which he lived on the subject of the local high school. He opened his remarks this way: "We are here tonight because, it appears, ———— doesn't know where its high school is going—and is none too sure where it has been."

He was talking, of course, of the situation in his own town. But the same remark could be made with equal justification in almost any community in America. The simple fact is that most of our citizens have a very hazy idea of what has been happening in their schools since they themselves left them. And for this reason, many of them are confused and sometimes distrustful of where the schools are going.

The questions they ask are basic ones. My friend reduced the problems bothering his fellow citizens to these two broad categories:

"Whom are we trying to educate and for what?" And, "What do we mean by education?"

I think he left out one other basic question. It is this: What share of the responsibility for education belongs to the citizens and what share belongs to the professional educators?

Now questions of this breadth and complexity rarely appear in such abstract form. Instead, they are compounded of literally hundreds of specific questions which vary widely from community to community and from individual to individual. And since it is the specific question rather than the abstract one which educators are daily called upon to answer, let us see if we can break down these broad categories into some of their more familiar component parts.

Specifically what do our citizens want to know about the kind of people we are trying to educate? What sort of questions do they have about our educational goals?

To begin with, I think there is a deceptively simple but vitally important question lurking in the minds of many men and women who were themselves graduated from high school before universal education had become an established fact in this country. If expressed honestly, it amounts to this: *Should* we be trying to educate everybody? Is universal educational a feasible, or even a desirable, goal? Can we, in opening the doors of our high schools to all of our young people, avoid debasing the general quality of our high school product?

It is easy to dismiss such a question as a sign of intellectual snobbery or of a general lack of faith in education. There are many honest, reasoning people who suffer from neither fault, but to them the problem is nevertheless both real and important. As I look back on my own educational experience, I think I can see why. When I attended high school in 1914, only 8 per cent of the young people of my age group were receiving a secondary education. Most of us were going on through college. Last year 80 per cent of our country's high school age group went to high school, but only 20 per cent were preparing

for college. Many of my contemporaries have had no opportunity to keep up with the developments in curriculum, and in techniques that have accompanied this change in our educational commitment. They have only imperfect memories of their own school experiences by which to judge present day schools. Small wonder that they should question the wisdom of exposing all our young people to the highly formalized college preparatory curriculum to which they themselves were subjected! Small wonder that they should preceive in such wholesale enrollments a "lowering" of the standards to which the schools adhered in their day! Their questions come, not from lack of faith, but from lack of understanding!

There is another question closely allied to this: Assuming that universal education is a desirable goal, can we afford it? Some of our citizens doubt that we can. And here again, their doubt is less a sign of dissatisfaction than it is of simple misunderstanding of the role that the schools have played in our country's development.

In a recent talk, I tried to draw a parallel between the growth of the school system in North Carolina and the state's economic, social and cultural development. I was pleased to find that I had struck a vein rich in public interest. Many people who had seen printed copies of the speech expressed surprise that education can be shown to bear such a direct relationship to the general welfare of a state. Like many other people, they were aware that education improves individual opportunities and that in a general sense it contributes to the life of the community. But they were not fully aware of how direct or how important the relationship is. I imagine that very few citizens would question school expenditures if they fully understood how the community benefits from its educational investment.

There are many other things that our citizens want to know about the nation's educational commitment and goals. They are curious about the changes that have taken place in the schools since they left them. They ask for reasons behind the changes and about the effects these changes will have on their own children. They ask questions like this: What does "training for citizenship" mean? Who is to decide what a "good" citizen should believe? How does the responsibility of the school merge with the responsibility of home and of church? How can the schools emphasize the moral and ethical values of which they speak without endangering the principle of separation of church and state? Is it true that values have largely been eliminated from the schools? Is it true that textbooks are *leftist?*

Parents are interested in the details of the curriculum. My local friend found that his neighbors were curious about the merits of competitive grading. Would it be better to grade each student in relation to his ability? Or would such a technique give certain students an exaggerated and misleading conception of their own talents? What can a school guidance program be expected to accomplish? Should manual training be compulsory for all? Has the modern school sacrificed sound training in certain "basic" subjects to make way for subjects not properly within its province? And so forth.

Not long ago I had lunch with a layman who expressed great concern over another facet of the educational problem. He had read in his morning newspaper that nearly half of the class of 1952 in New York State high schools dropped out before graduation, and he wanted to know why. That question is being asked by many laymen today. Why can't we devise a way better to meet the requirements of these students? Where are we failing them? If low intelligence is the major reason for their dropping out, as many apparently seem to think, how can we give them material they are capable of handling without retarding the more brilliant students? How, in other words, can we educate the average and below average without making it difficult for the schools to discharge their important function of training for leadership?

In these and many other ways, citizens are rephrasing and re-examining the first of the two basic questions my friend put to his friends and neighbors: Whom are we trying to educate and for what? They are equally concerned but perhaps less vociferous about the implications of the second: What do we mean by education?

The questions of citizens respecting the nature of education are but reflections of the controversy that has raged in professional circles for many years. They also reflect the rapid and sudden change in our country's educational commitment. The more thoughtful of our citizens are asking this: What sort of balance should we strike between practical and vocational training directed primarily to earning a living, and a more liberal education directed to acquainting our young people with the cultural heritage of the western world? How much emphasis, they ask, should we put on intellectual ability? How valid are the standards of the liberal arts colleges as a goal toward which to direct our educational programs? What other standards might we use?

Many lay citizens are confused by the conflicting testimony about the educational theories of

John Dewey. What precisely did Dewey mean by his dictum "we learn by doing"? Was it an invitation to relax intellectual standards as some people have suggested, or was it instead an invitation to more creative individual thinking? How have Dewey's theories affected the school curriculum? What do educators mean when they speak of "child-centered education," of the "integrated" or the "whole" personality, of the measurement of "attitudes," or of "functionalism" or "traditionalism"?

Implicit in this interest in the nature of education is an interest in the sort of people who are to administer it. Our citizens wonder how teachers should be trained. Are the programs in some teacher's colleges inferior to the programs in the liberal arts colleges (or vice versa), and if so, why? How does the training of teachers today compare with their training a generation or two ago? What inducements can we offer to make a teaching career appealing to more college graduates? How can we increase the number of teachers and also raise the calibre of the profession at the same time?

To many educators, harried as they have been by unfair criticisms from a dissident minority, questions such as these often appear to be antagonistic. I do not believe that they are always, or often so intended. Certainly there exists a group of critics who simply do not believe in free universal education, to whom anything the schools attempt is automatically wrong. But our more sincere citizens are vastly in the majority, and their questions proceed from an honest desire to learn what has been going on in the schools and, even more important, from a desire to *help* the schools to do a better job in the future.

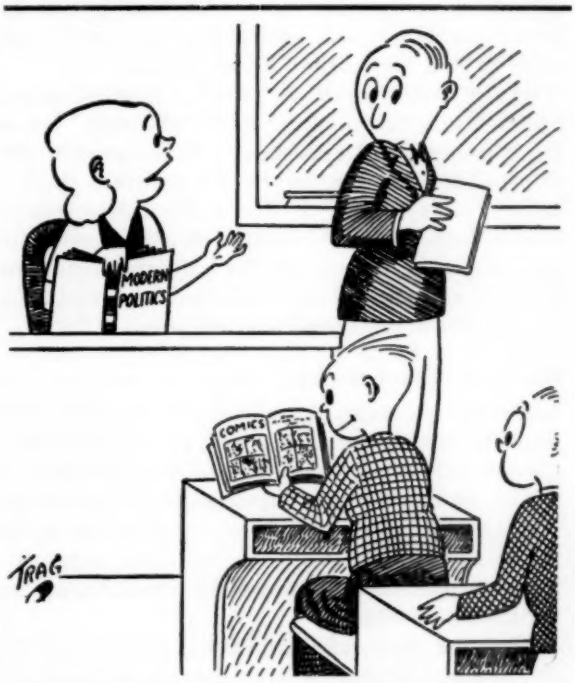
This last attitude on the part of our citizens, this desire to help the schools by participating in school affairs, is to me the most encouraging educational development of recent years. It is an attitude amply reflected in the thousands of letters that the National Citizens Commission for the Public Schools has received from citizens all over the country. All of them return in one way or another to the same theme: In what way can we as citizens share responsibility for the schools with the educators of our communities?

That question has been asked of us so many times and in so many forms that we have recently tried to break it down into its component parts and to answer it in a series of working guides. In these we shall try to help citizens find the source of answers to their questions on such things as the supply of teachers, school finance, school buildings, school boards and administration.

It has become increasingly evident that simply by voicing their questions and looking for the answers our citizens can reach a better understanding of the functions of their schools and of their own responsibility for them. We should be encouraged by the fact that questions—any kind of questions—are being asked. This in itself is a sign that the long period of public apathy from which the schools have suffered so much in the last generation or so is at last coming to a close.

Honest questions from our citizens, even if they are elementary and confused, and most of them are far from that, are never irrelevant. They should be answered carefully, candidly and completely, for they are the first step toward understanding. And understanding, after all, is the first step toward better public schools.

[The responsibility of all persons and groups who seek to help citizens find reasonably satisfactory answers to such perplexing questions is very real. To some there is the challenge for original inquiry, to others for interpretation, discrimination, and dissemination of knowledge. There are cautions to be observed in both, lest wrong conclusions be reached. These challenges do not represent mutually exclusive roles. The key to their fulfillment lies in cooperative action: On the part of the public, greater financial support of educational research; on the part of the profession, even greater dedication to the search for increased knowledge of truth, wherever found.—Ed.]



"Some of Them Carry on Research in Rather Inconsequential Fields, Sir."

—Adapted from *The Texas Outlook.*

Some Questions Educators Ask

Research is not necessary to answer many questions that confront teachers and administrators, and parents. But research can make a significant contribution in answering an enormous number of them. The writer of this article is an administrator of keen insight and rare judgment in analyzing educational problems. Here he presents a few sample questions in each of several educational areas.

By HEROLD C. HUNT*

EVERYBODY LOVES a question—or so one would judge from the way we sit before our radios and television screens, listening to or watching "Who am I?," "Where Was I?," "What's My Line?," and the myriad other shows with their sixty-four dollar questions, their jackpot stumpers, and their consolatory: "Who is buried in Grant's Tomb?"

Educators, too, are fascinated by questions, or perhaps it might be more accurate to say that we are plagued with them and fascinated by the search for answers. Certain it is that wherever educators congregate one will find questions being raised, argued, sometimes answered, and often tabled for further investigation.

In vaudeville routines, revived from oblivion by television, one actor, the "straight man," raises the questions and another actor, the star of the show, draws the laughs with his answers, the so-called "punch lines." In the rarified atmosphere of the present symposium, it is our mission to play the part of one of the straight men; our starring colleagues can then tell our audience where and how to seek the answers.

Questions Teachers Ask

Not all questions raised by educators require research to reach an answer. The administrator, for example, finds that a knowledge of his own school or his own system suffices to answer the common or garden variety of question raised by his teachers:

How shall we take care of Room 213 until the substitute arrives?

Can the assembly exhibits be removed this morning so that 8A can use the auditorium for a rehearsal this afternoon?

Miss Jones would just as soon take this week's entrance hall duty of Mrs. Brown, who has just returned from a case of flu, provided someone takes her lunchroom duty; and since I have no duty this week, would it be all right for us to make the change and for Mrs. Brown to take my second-floor West corridor duty next week?

Sometimes teachers' questions may require investigation, planning, and thought, even though formal research may not be needed:

Can a plan be worked out for fewer collections for various causes?

What can be done to widen social contacts among our teachers?

Can the payroll office arrange to distribute teachers' checks on Thursdays?

Questions Administrators Ask

Administrators' questions, too, may involve a type of investigation which in a broad sense only can be considered in the research category:

How can we improve our transportation plan for visiting museums and similar institutions?

Should departmentalized instruction be continued in this school?

Should we make some changes in our school district boundaries?

Research can make a significant contribution, however, to an enormous number of questions raised by teachers and administrators. A complete list would probably fill this entire journal, and I am not certain what purpose would be served by attempting to compile it. It does seem profitable, on the other hand, for us to examine a few sample questions in a number of educational areas.

* Herold C. Hunt (Omega 56) recently joined the faculty of the Graduate School of Education, Harvard University. This article was written while he was yet General Superintendent of the Chicago Public Schools.

Administrators, for example, are concerned with many questions of a general nature, such as:

What administrative procedures are best for promoting good relationships between the principal and his faculty?

Just what is the role of the principal under a democratic type of school administration?

How can supervision make its most constructive contribution to the learning process?

Many of the most challenging questions faced by administrators are more specific in their nature:

What are sound policies with respect to contests and activities offered to schools by outside organizations?

How can the schools best meet organized attacks on education?

How shall we handle the question of released time for religious education?

What should be done about proposals for year-round education?

How can we best educate the children of migratory workers?

How can young people who have left school earn a certificate of high school equivalence or a diploma?

What are the most effective ways of dealing with high school fraternities and sororities?

How can the student council make its greatest contribution to the school as a whole?

Among the most pressing problems confronting public education today are the issues of securing increased funds, increased plant, and increased personnel. In general, however, I take it that these are practical problems, not of the type for which one sets up a research program in his search for an answer. We shall concern ourselves more with the instructional and guidance program of the schools.

Questions About Curriculum

Curriculum problems have received a great deal of attention over the past several years; everyone recognizes that they are of paramount importance:

How can we set up a school program that will insure continuous and related learning for all students in all areas?

How can we make certain that children's emotional needs are being cared for adequately?

How can we initiate a sound life adjustment education program?

How can we increase teacher acceptance of a life adjustment education program?

How can citizenship training be made most effective?

What are the best ways of instilling respect for public property and caring for it?

How can emphasis on moral and spiritual values be made to permeate the program?

How can we establish firm habits of engaging in wholesome leisure-time activities?

What is the place of consumer education in the high school curriculum?

Questions Both Ask

Modern issues and problems often create questions that are of concern to the administrator and the teacher:

What type of instruction should we provide to promote better international understanding?

What should be done to improve our air-age instruction?

How should we present controversial issues at the various academic levels?

How can we insure that biased conclusions are not forced upon pupils when public issues are being discussed?

Some questions are partly a matter of instruction and partly a matter of administration:

What provisions should we make for the education of the gifted?

What is the most feasible and effective program for slow-learning students?

What provision should be made for improvement of reading and other basic skills in junior and senior high schools?

Questions Guidance Raises

The guidance field has been expanding very rapidly over the past several years. Educators find many challenging questions in this area:

How can we provide counseling services for all students?

What is the most effective program for discovering individual differences?

How can the instructional program best be adjusted to meet these individual differences?

What steps can we take in an effort to meet the emotional needs of individual pupils?

How far should the school go in investigating a child's home and community background in an effort to understand him better as an individual?

How can we train pupils in realistic self-evaluation?

In what ways can the schools co-operate with and profit from the work of outside guidance agencies?

What part can the guidance program play in reducing the number of early school leavers?

Much of the early guidance work in the schools was related to vocational orientation. New tech-

niques have been developed over the years, but many of the early questions are still with us:

How can we best help students to learn and understand their own vocational aptitudes and limitations?

How can we best help students to understand the economic complexities of the world in which they will find their work?

What placement services can we provide for our secondary school and community college graduates?

What sort of follow-up employment services is it practical for schools to provide?

The work experience program is a comparatively recent development which raises its own interesting questions:

How can conflicting interests of the student, the school, and the employer in a work experience program be reconciled?

How can significant work experience be provided in non-remunerative employment in school and community activities?

How can the work experience program and school placement services best be integrated?

Questions of Evaluation

Both instruction and guidance call for evaluation of many kinds. Here again we find numerous questions that attract the attention of teachers and administrators:

How can we make the recording and reporting of pupil achievement more reliable?

How should the secondary school evaluate and record student progress?

What special evaluation procedures are needed for appraising the results of a life adjustment education program?

What proportion of administrative and instructional effort, time, and expense should be devoted to evaluation?

What is the most effective machinery for insuring prompt and appropriate use of evaluation results when they are obtained?

Questions About Materials and Aids

An enormous number of questions centers around instructional facilities, instructional materials, and instructional aids. Questions in these areas we shall merely hint at, pausing only to record an illustrative few:

What is the most suitable and economical form of school lighting?

What is the most practical and economical type of seating at the different grade levels?

What new developments in educational plant facilities should be adopted in a specific school?

What is the most effective school library organization for a certain school or system?

How should textbooks be selected?

What use should be made of audio-visual materials in the instructional program?

How can we best utilize television?

By No Means Least, the Staff

The most important part of the entire instructional program is the instructional staff, which means that many of our most vital questions have to do with the faculty:

How can we recruit better candidates for teaching?

How can faculty meetings be used to stimulate professional growth?

What can be done to stimuate the community to accept teachers at a professional social level and provide them with appropriate working conditions, salary, and housing?

What should be done to improve the professional standards of principals?

What are the most effective methods of on-the-job training for teachers and administrators?

What About the Community?

More and more, educators are seeing their schools in a relationship to their community that is both intimate and broad. Many questions arise in connection with this relationship:

To what extent and under what circumstances should school plant facilities be made available for community use during nonschool hours?

How much initiative should the school take in improving local commercial recreation?

How much responsibility should the school take for public recreational facilities?

To what extent should the school attempt to discover and eliminate local conditions unfavorable to wholesome living?

How can the schools secure evidence concerning the effectiveness of their program in reducing juvenile delinquency?

Questions About Health, Athletics and Safety

An already great and still expanding field lies in the area of health and safety in education. We shall mention only a few of the great number of questions related to this subject:

What is the best machinery for insuring that all children and young people in the community receive systematic medical and dental attention?

What should a complete and effective safety program include, and how should its various provisions be implemented?

(Concluded on page 68)

Enabling Research to Answer

When scientific investigation clears up some of its methodological problems, it can acquire a place of leadership in education comparable to other areas of human endeavor. Many questions raised about education demand investigations by teams rather than by isolated, individual research workers. Support of educational research must be extended to practicing educational institutions (local school systems). Close cooperation between research workers and educational practitioners has advantages for both, and research must be translated into educational practice and verified before it can be considered fruitful in practice.

By CYRIL J. HOYT*

CONCRETE EVIDENCE currently exists of significant long-term influences of research programs in industry, medicine, and agriculture, but such evidence is not so apparent in education. The meager support of educational research is regrettable, especially when one considers the amount expended for education and how important it is that human potentialities be fully realized. Among the most important long-range outcomes of research in any field are:

1. Manifold and profitable discoveries, inventions, and improvements, resulting directly from research activities, have been incorporated directly into the respective enterprises.
2. Great and rapid advancements have been made in the basic sciences upon which the practices of the particular enterprise rest. (For example, physiology has been advanced by research on problems presented by medical practice, organic chemistry by those arising in the petroleum industry, and genetics by those of agriculture.)
3. Appropriate schemes have been developed for conducting "field trials" of laboratory findings in the locale and area of expected applicability. Such testing has safeguarded the professional practitioner against too hasty or too extensive generalizations from limited experimental results.
4. Research, as a life-long profession, provides sufficient personal satisfaction, and enjoys the prestige necessary for attracting and holding some of the most capable individuals in the enterprise.
5. The public and professional workers have developed such confidence in research that they demand research evidence as basic to their practices.

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I. AN ADEQUATE RESEARCH PROGRAM

These are some of the kinds of long-range benefits which can be expected to accrue to education if appropriate support and emphasis is given to educational research. The first two benefits directly improve practice while the third and fourth provide protection to the professional practitioner from the overenthusiastic (and sometimes inexperienced) graduate degree candidate by whom so large a portion of educational "research" is now done. The second and the fourth are the kind of benefits which every enterprise must acquire if its research is to reach full maturity.

Comprehensive Evaluation of Changes

In evaluating any educational practice, it is necessary to consider every aspect—social, emotional, intellectual—of the child's immediate and long-range behavior. Much current educational practice is based upon investigations that were far too limited in the scope of their evaluation and controls. For example, instructional methods have been evaluated in terms of their effects in rather narrow or limited areas, such as proficiency in a certain computational process, or in assimilating facts and principles in some particular subject. It is, however, entirely possible that instructional methods and materials which are beneficial in such a narrow realm of human behavior may be detrimental in their total effect. To illustrate: some routine drill procedures may help pupils to develop certain skills but, at the same time, they may create in most of the chil-

dren such a dislike for the subject that they shun, rather than grasp, further study. Consequently, one must evaluate an educational practice or any of its components comprehensively, taking into account every factor and every combination of factors, and their effect upon every pertinent facet of the individual's behavior.

Specialists Work in Teams

Such investigations of educational problems must involve a *team* of research workers. The generalist has in the past studied society and its needs, but often he has not studied thoroughly the process by which individuals learn. As a consequence, it is impossible for him to apply his thinking directly to the problems of teaching. His conclusions, therefore, have often been unsound. Practical experience has often shown ways in which the generalist's approaches were inefficient or even detrimental.

There is real need, in evaluating educational practices, to test both the suggestions of the generalists and the findings of the specialists, by studying the same children for several years. In some cases, the generalist has been found to be little more than a wishful thinker; the specialist has done little more than deal with educational minutiae of a temporary nature. Neither the generalist nor any one specialist, by himself, has the tools necessary for investigating any one of the complex problems of education. Such problems can be studied adequately only through broad, long-range projects in which both generalists and specialists collaborate, and which make full use of the most advanced research design and statistical analysis. An adequate educational research program must achieve such an amalgamation of intellectual resources.

Limitations of Current Methodology

Current research is restricted largely by limitations in (a) ability to define and measure behavior precisely, and (b) experimental design and statistical methods of analysis used by educational research workers. In order to remove these restrictions and thus make distinct advancement in investigating more complex aspects of education, it is necessary to give considerable emphasis to further development of the methodology of educational research.

Research on educational and psychological problems has, in the past, provided little evidence of the inter-relationships of influential factors in a complex situation, because it has been tied down methodologically to the so-called "law" of the single variable.[1] In the first place, it is impossible to achieve such constancy and control of all other factors. In the past, it was "achieved" largely by definitions, or by ignoring other variables and trusting that they did not affect the outcome of the experiment. Modern research in industry, medicine, agriculture, physics, and chemistry recognizes this shortcoming of the classical "single variable" approach and is currently modifying its methods. In the second place, holding the conditions constant seriously limits the general conclusions that may be drawn from the experiment, since nothing is learned about the effects of the experimental factors when those temporarily held constant are allowed to vary. Likewise, the experiment gives no information about the interactions between the variable investigated and the ones held constant.

Modern Research Uses "Field Trials"

Recognition of the limitations of the classical, laboratory type of research is evident in the demand for "road tests" or "field trials" in industry, medicine, agriculture, and other enterprises. Furthermore, recent advances in experimental design and statistical methods of analysis have made it possible to draw valid conclusions about causative factors when more than one factor is allowed to become variable in a single investigation. Palmer O. Johnson in 1951,[2] and again in this issue of PHI DELTA KAPPAN, draws attention to this weakness of the "classical" experiment and to the possibilities of multivariate analysis.[3]

Both the findings and the methods of full-scale research programs are of such importance in education that more and more institutions should reemphasize the role of research. Only thus can scientific investigation assume the place of leadership in education which it currently holds in other areas of human endeavor.

II. BRIDGING THE GAP

With the above description of some general characteristics of research, we now turn to a consideration of some changes helpful in achieving the desired leadership. In this section, we shall consider (a) certain characteristics of questions appropriate to guide the research activities of a profession; (b) certain evidence of the necessity for changes in current procedures for selection, training and recognition of professional leaders; and, (c) the necessity of cooperation of school administrative and instructional personnel with

[1] T. R. McConnell, "The Nature of Educational Research," *Educational Record*, 22:575-595, October, 1941.
[2] Palmer O. Johnson, "Modern Statistical Science and Its Function in Educational and Psychological Research," *The Scientific Monthly*, 42:385-396, June, 1951.
[3] See pages 35-40, inclusive.

research workers so that many schools will institute research programs corresponding to those known to industry as "proving grounds" or "road tests," and to agriculture as "field trials."

Most of us engaged in education are aware that professional practices adequate in one generation are not necessarily satisfactory in a later one. This comes about through the changing character of (a) demands which society makes on an "educated" individual (i.e., a change in criteria), and (b) new instructional materials and accumulated knowledge of human behavior. Hence, the questions we ask, and to which we expect answers from research investigation, must reflect an awareness of the necessity for a re-examination of conclusions at various points in time, locations and social situations. This manner of asking questions places new responsibilities on both research workers and on practicing educators, which, if assumed, will in turn result in benefits to all.

Professional Dedication the Need

If we would seek the "best" we must, as practicing educators, keep hunting for the "better than what we have or what we know." In the realm of manufacturing, competition and the profit motive drive our industries to invest more and more resources in their research enterprises. Thus to find the best, we must be continually experimenting and testing what we are doing, alongside an ever inventive drive to try out and to evaluate the new by contrast with the current practice. This means that just as every manufacturer must support research, every practicing educational institution must do so. When a competitor in a specific manufacture ceases to support research, the company soon loses its identity as a real competitor.

Since most aspects of the educational enterprise are not subject to the same savage law of competition, many practicing schoolmen are insulated against immediate devastation and demolition by competing schoolmen. Although this lack of competition is not wholly lacking in all aspects of education, such as musical, dramatic, forensic and athletic coaching, it appears that the American dedication to public support of education is not conducive to the utilization of competition as a device for stimulating our search for improved practices.

Does this lack of competition mean that extensive research activity and widespread application of the findings must ever be kept at the current low level? I have such confidence in the humanitarian character of our profession, and of interested lay groups, that my answer will always be in the negative. In fact, there is concrete evidence currently to indicate a wider interest, at least at the verbal level, in improving the support for educational research.

Personal Responsibility Will Demand Research

Certainly many, perhaps the majority, of medical practitioners, because of their interest in humanity and their desire to relieve human suffering, are impelled to improve their practices through the study of research reports and through participation in symposia and other in-service training institutes. For similar progress in education and in the practitioner's interest in improvment, we must rely on similar motives among educators. Such motives necessitate the cultivation of teachers' interests in individual pupils. When a teacher becomes interested in the progress of the individual child, it is likely that his search for improved practices will be greatly stimulated. Many teachers, though probably not the majority, are currently and intensely seeking improvement in their ability to direct the learning activities of individual pupils. Far more emphasis must be placed upon the development of the abilities of and the facilities for teachers to observe the progress of individual pupils toward significant educational goals. When more teachers accept personal responsibility for and can observe the progress of individual pupils, then we can expect that educators' motives, like those of medical practitioners, will demand and stimulate progress in educational research on dynamic questions arising in practical school situations.

Too Much Is Student Research

Certain inadequacies in the current training of research workers have been considered by Freeman, Brownell and others.[4] One of the most crucial effects of current policies in the selection, training, and promotion of educational leaders, and in the present meager support of research activities, is the large proportion of educational research produced by students who are candidates for graduate degrees. For example, at the end of 1947, 79 per cent of the authors of research papers dealing with arithmetic instruction report only a single piece of research and later produce no more; the corresponding figure for reading is 76 per cent, for spelling 82 per cent, and for English 82 per cent. Further study of Smith's[5] data show that about half of the educational research reported is not produced by ex-

[4] Graduate Study in Education, Part I, *Fiftieth Yearbook of the National Society for the Study of Education* (1951).
[5] Lawrence J. Smith, "Research Workers in Selected School Subjects," *Journal of Educ. Research*, 45:255-273, Dec., 1951.

perienced research workers with a persistent and compelling drive to investigate the important problems in some area or aspect of education. The training of research workers as well as the emphasis on the importance of research in the professional progress of leaders must be altered in a manner that will modify the sources of educational research. We cannot expect experienced practitioners to have confidence in the results of research when the producer himself considers it unworthy of further investigation. This student production of research reports tends to degrade the place of research in the eyes of professional practitioners.

Growing Importance of Team Work

A second inadequacy in the current training of research workers arises from the failure to recognize that educational problems are so complex that an adequate attack requires the skills of a number of people working together. Hence, research workers must develop the skills required for working cooperatively. These research teams will usually not be composed of the same individuals for more than a limited number of investigations. Hence, each individual in the group must have certain abilities to recognize and to solve the inter-personal problems that keep a team from working effectively, as well as the abilities to make his own unique contribution to the solution of the educational problem under investigation.

Thirdly, the accomplishment of effective educational research is dependent upon more extensive cooperation between research workers and professional personnel. Each must learn from the other and be willing to make those adjustments in their usual procedures necessary in making adequate local "field trials" or "road tests" of hypotheses and generalizations. In many instances, these activities will result in additional expenditures, locally, since some instructional personnel may be required to devote time to testing modified instructional practices for which certain advantages are claimed. It seems necessary that much local testing of research findings be done, both to help experienced teachers to become adept with modified practices, and to enable them to assess the total effects of the modifications, under varied local conditions.

The manifold benefits that professional practice derives from educational research are balanced by its own contributions; it constitutes the only means by which the results of research can affect children. We know that professional practice depends on research. We know that the conduct of research is enriched by a direct association with teaching activities. The mutual benefits accruing to such a research program are evident in the following activities: defining the problem, specifying the evaluative criteria, collecting the data, appraising the results, and putting the conclusions into use. In each of these five phases of an investigation, cooperation between research workers and educational practitioners shows marked advantages for both.

Although other specialist teammates can help to define and select crucial educational problems, it is clear that research workers need the cooperation of classroom teachers and others who are skilled in observing pupil behavior. Thus, communication between the teacher and the research worker should be maintained from the very inception of the investigation.

In specifying evaluative criteria, research workers developing pupil appraisal devices should be given considerable opportunity to observe pupil behavior. Thus, research benefits because specialists are enabled to observe variations in children's behavior during preliminary trials of any educational variant. Such observation of children is necessary as an initial step in specifying the criteria appropriate for the evaluation of any such variants—the experimental variables.

While the data for an investigation are being collected, and during the pilot study preceding, research workers should make observations of how nearly alike two or more teachers interpret directions for modifying their instructional procedures. If the teachers' interpretations vary widely, then modifications in their training, or in the experimental design, may be necessary.

Only Verified Research Fruitful

The evaluation of variants in the educational structure under appraisal must be done either in terms of (a) the effects upon the behavior of children, or (b) some secondary criteria which must, in turn, be validated against child behavior. Thus, a study expected to modify a teacher training program will necessitate an evaluation of the effects of teachers on children's behavior, or an evaluation of teacher characteristics which can be shown to influence pupil behavior.

Lack of cooperation between research workers and educational practitioners often results in research findings which either cannot be, or for some other reason are not, translated into the educational activities. For example, a group of therapists may present evidence that certain types of educational activities are instrumental

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A More Effective Instrument

To become more effective, educational research needs better public support both psychologically and financially. It must be wanted, respected, and financed on a scale commensurate with the problems of a complex society. There must be more effective participation by laymen, administrators, and teachers. Every significant problem is worthy of a careful study of "What does research say?"

By J. CAYCE MORRISON*

PRECEDING ARTICLES in this issue of PHI DELTA KAPPAN have stated the case for educational research—its nature, its importance, its practical value, its promising methodologies, and its translation into use. In this article, we shall examine some fundamental issues involved in making research a more effective instrument in the continuing improvement of education.

Public Support for Educational Research

Support means both psychological approval and financial aid. To be an effective instrument, educational research must be wanted, it must be respected, and it must be financed on a scale commensurate with the educational problems confronting a rapidly changing society.

Educational research must be wanted. As in business and industry, research in education is a development of the Twentieth Century. In general, research started with individuals in the graduate schools of education, men who had vision and who were gradually freed, in part, as Leonardo da Vinci phrased it, "to search for knowledge of things that may be." Gradually, some of them were given assistants and were allowed to give full time to research. Thus developed the bureaus and other organized units for educational research in colleges and universities, and later in city and state school systems. In general, educational research has contributed to the improvement of education through vast increases in knowledge of educational theory and practice. These results have been incorporated in the education of teachers, supervisors and administrators; utilized in the development of curriculums, in the making of textbooks and other materials of instruction; and published in an increasing volume of educational literature.

Trend Is Toward Research Bureaus

A practical application of one methodology of research has been the school survey. The survey has tended to disseminate knowledge gained from other research and to apply research methods to inquiry and evaluation. In the early decades of this century, the school survey generally was limited to situations where difficulties had arisen, and whose solution seemed beyond the capacity of local resources. There is now a tendency to use the survey as a constructive means, in anticipating future needs and in planning the solution of problems not yet acute.

Paralleling the development of organized educational research in the universities, state and city school systems have gained some experience in planning, organization and use of educational research. In school systems as in universities, the question inevitably arises: shall the research function be exercised by a special staff, organized and assigned full time to research, or by regular members of the staff giving part time to research, or by some combination of the administrative-supervisory and research staffs? The trend is toward organized research units devoting full time to it.

Educational administration is continually confronted with problems. Many can be resolved by the exercise of good judgment or by the use of data accessible to officials charged with operation. Other problems require the collection of data not readily available, the conduct of inquiry that cuts across the fields of different operating units, the utilization of highly technical research methodologies, and the expenditure of

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time not available to the regular operating staff. In this more complicated area of administrative operation the organized research staff proves a good investment.

Anticipating Problems Through Research

In this century of rapid change, successful educational administration is dependent upon anticipating problems that may arise and on having the evidence, in advance, needed for their effective solution. Stated differently, educational administration is continuously confronted with the necessity for evaluation of programs and the formulation of policies. In this broad area of educational planning research pays good dividends.

Educational research requires the best personnel. In an administrative organization, the research staff must work in close collaboration with the administrative-supervisory staff. It needs to be sensitive to the problems of teachers, parents and the public. Members of a research staff need all of those personal qualities required in working with people. The person assigned to research needs or must acquire a broad understanding of education; he may find himself working on any phase of it. He needs intellectual capacity and educational background for tackling educational problems *in depth*. Whatever the problems, the research specialist, to be useful, must probe deeper than the operating generalist.

To be effective, the research staff should be represented at the policy making level. Only through such representation can the research unit be fully sensitive to current and pending pressures on administration, to long range issues for which preparation should be made, and to the varying trends of thought which must be considered in planning and conducting any research.

Sensitivity to Public Needs and Aspirations

Research costs money. As the Israelites in Ancient Egypt found it difficult to make bricks without straw, so today's research staff will produce poorly unless adequately financed. It is difficult to educate the public and its representatives to an understanding of the values to be obtained from appropriations for research. Moreover, it is easier for the administrator, confronted with the alternative of accepting a lower budget than he has recommended, to urge appropriations for administration that must be done rather than for research which the public has not yet been educated to expect or to demand.

In the early part of this century, educational research was largely dependent upon the great foundations. With the current trend toward more educational trusts, the lure of easy money for educational research is again a temptation to many. In the future, as in the past, much good educational research will be financed by educational foundations. But society cannot escape the fact that the same considerations which prompt their organization will affect the administration of their funds. As a counter to these influences, research in public education will thrive best, in the long pull, by drawing its chief support from public sources, thereby assuring its continuing sensitivity to the needs and aspirations of all.

Distribution of the Load

There is much yet to be learned concerning the most effective distribution of the research load among educational institutions and agencies. Every good state university undertaking graduate training in education will subsidize educational research. Every state department of education should maintain a staff in educational research. Their several research activities may properly be planned as a single state program. Within the several sub-divisions of the state school system, there remains a number of still unresolved problems with respect to educational research. For example, how large must a local school system be to justify the employment of a competent person to give his or her full time to research? What portion of the school budget should be allocated either to finance a full time research staff or to employ research service from outside? What portion of the budget should be given to recurring research service and what portion to special projects? A thorough study of the records of the research bureaus in city and state school systems and in universities that have operated continuously for more than 25 years should provide information useful to everyone concerned with planning and financing educational research during the next quarter century.

"Something to Happen in Our Lifetime"

In the educational literature of recent years, one finds increasing use of such terms as the participatory process, cooperative research, functional research and action research. Such phrases reflect the increasing concern of educators to make research an effective instrument in improving education.

The foregoing terminology reflects the efforts made to differentiate between the research and administrative functions. More important has been the inadequate perception of relationship between the two functions. In the United States, educational research is currently moving rapidly

toward developing programs involving the cooperative effort of laymen, teachers, administrators, and research workers. This trend is due, in large measure, to the growing realization that reforms cannot wait, that the lag between learning what should be done and doing it should be reduced to the shortest possible span. As a great leader in industrial research once said, "We want to see something happen in our lifetime."

Participation Leads to Action

Participation is a process of learning. One limitation on the use of educational research has been the tendency of research staffs to work more or less in a vacuum. The research worker tended to define the problem, plan and conduct the study, interpret the data and write his report in isolation from those who would translate his recommendations into action.

To find immediate or early acceptance for any research in education requires the development of a consumer public. Stated differently, the people who may be expected to translate research recommendations into practice will do so more effectively when they participate in defining the problem, planning the broad scope of the study, collecting the data, interpreting the findings and reviewing the recommendations. Through such participation, those who will implement the research pass through an intensive process of learning. When the research is finished, there are few surprises ahead of them. They are ready to carry on. The need for a period of reeducation is reduced or eliminated.

Operative Leadership in Research

Participation in the processes of educational research is a means to action. In any administrative organization there are two types of relationship between the research and operative functions. In one, leadership rests with the operative unit. In some cases the operative unit assumes full responsibility. As a rule, such studies are limited to problems wholly within the administrative area assigned to the unit. The research is subordinated to the administrative objectives of the unit and not infrequently reflects the vested interest of those in charge. The fact that research is time consuming places another limitation on research by the administrative unit. If research supervision is well done, the administrative-supervisory function inevitably is neglected. A good rule to follow is that the administrative or operative unit should assume full responsibility only for research which becomes a continuing service of that unit.

Wherever the new or the untried comes into question, whenever the rigorous processes of evaluation are demanded, the research staff should be involved. The degree of involvement may vary with different problems and in different situations.

There are many large-scale studies looking toward improvement in particular areas of service, such as the reformulation of standards in physical education, the development of a statewide program of social studies, the readjustment of the high school program, when the leadership may properly be vested in the operative units with the research staff playing a supporting role. The research staff will help to define the program of study and the specific problems for research; it may assume responsibility for conducting specific studies in the total program; and it will serve in a consultative capacity in studies assigned to other staff members. In such studies, the major emphasis is upon lifting the level of lay and/or professional understanding through the processes of participation in study, conference, group discussion and the use of simpler techniques of inquiry.

Reserved for Research Staff Leadership

A second type of relationship between it and the administrative-supervisory-teacher groups places the leadership of the project or program in the research staff.

In this type the major emphasis is upon the research—evaluation of a program; study of a problem whose solution cuts across the fields of two or more operating units; collection and analysis of large bodies of data essential to the formulation of educational policy; critical testing of new proposals; developing new instruments, techniques and methods. The particular research may stem from the vision of an individual, from growing criticism of a program or policy, from social pressures reflecting changing conditions, or from increasing group awareness of emerging problems, and so on.

Whatever the origin of the project, the value of research will depend upon the use made of the findings. Except in those studies designed to improve the methodology of research itself, use will be contingent upon the decision of the administration or groups affected. Therefore, the research staff will seek the cooperation of interested groups, administrative units, or agencies. Such cooperation may be given through advisory committees, consultation by representative officials, participation in the collection of data, organization of discussion groups, and dissemina-

tion of information concerning the nature, purpose, methodology and outcomes of the study. One such study, recently concluded, involved the cooperation of more than 75,000 persons.

While the precise nature of such relationship varies with every major research, there are elements of principle and procedure common to most researches where the chief responsibility is vested in a research staff.

Application of the Findings

There are many different means of implementing educational research. Here we are concerned with its use by school people—teachers, specialists, supervisors, administrators and boards of educational control.

"What does research say?" might very well be a guide to the discussion of every educational problem at every level. Sources of research material and methods of finding it were suggested earlier in this issue.[1]

Having examined the several sources available, the administrator, committee or staff will want a summary of the research bearing on the subject or problem under consideration. Sometimes, this summary will give all the information needed for action. Sometimes, the evidence will be conflicting. Frequently, the available research will give only part of the answer needed. In such cases, the individual or group will either seek new research on the unsolved phases of the problem or will take such action as may be necessary, based upon the best judgment available. These considerations bear upon the application of research findings generally available to all workers in education.

Where the Research Unit Fits

We turn now to the administrative organization having its own research unit, or funds to buy adequate research service. The administrator confronted with mounting criticism or an educational practice or program, or anticipating the need for formulating a new educational policy, will want a digest of the research that promises to contribute to the solution of his problem. Invariably, there will be facets of the problem not satisfactorily answered by available research. At this point, the research staff is called in to consider the possibility of obtaining this needed additional information.

Often, analysis of the problem against the background of available research indicates the need for an entirely new approach. This need may be due to prior influence of vested interests on either the available research or the current operation. The following illustrations are drawn from actual experience:

(a) Some years ago the New York State Education Law was revised with respect to control of ventilation in public school buildings. All provisions governing ventilation were stricken from the statutes and replaced by a simple statement requiring the commissioner of education to establish regulations governing ventilation of school buildings. The Commissioner asked for a digest of the research on the subject. The published research was carefully reviewed and a digest prepared. Without exception every research reviewed supported the mechanical control of school ventilation which had been stricken from the law. Further analysis disclosed that some of the researches examined had been financed by manufacturers of ventilating equipment and that all had accepted the principles embodied in earlier statutes. The fundamental question was whether a different theory of ventilation should be examined and tested.

Through the years, a member of the Yale University faculty had voiced a different theory. When called into consultation he made avilable to the Education Department staff and to the Advisory Committee on School Ventilation the results of his years of research. His theory was further tested. On the basis of his recommendation and the new tests conducted, the Commissioner's regulations were revised and have been generally accepted. Too often educational research has been conducted on the assumption that existing laws, regulations and practice cannot be changed. Any research concerned with the evaluation of programs or formulation of policy must look deeper than the existing legal structure and administrative policy.

(b) Any group of workers assigned to any particular field or area of educational endeavor tend to develop a vested interest in the program they are developing. This is natural. Once the goals are accepted, their responsibility is to work unceasingly toward the achievement of the goals set. There come times, however, when the administrator and board of control find it advisable to take a new look. Such decision may result from mounting criticism of the program, or from requests of those concerned for major expansion, or from desire to be certain that "all is well." Whatever the reason for the inquiry, the research staff is responsible for formulating the plan of inquiry and for utilizing the resources of the operating staff at all levels in planning and conducting the inquiry. The current study of elementary education in the State of New York illustrates the type of research growing out of the desire of the administration to take a long look ahead. In this study the Divisions of Research and of Elementary Education are working in close cooperation to bring into focus the best theory and practice as a guide to the further development.

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[1] See pages 49-52, inclusive.

They May at Least Become Friendly

By ROBERT R. NARDELLI*

EACH YEAR, hundreds of graduate students in education sally forth from college campuses to launch research experiments culminating, they hope, in a higher degree. Likewise, each year, many of these students are met with polite but firm refusals by administrators of schools in which, it was hoped, the experiments might take place.

To the fledgling researchist, a series of such refusals can prove quite disheartening. His proposed study has assumed, to him, a significance somewhat out of proportion to the value attached to it by some weary (and wary) administrator. And while the new experimenter may intensely believe that his work may, indeed, revolutionize educational thinking in his particular field, the earthy, hard-working administrator often refuses to be overwhelmed by a sense of its pressing need. He has been "researched" before!

The reception given to a beginner is quite different from that given to an individual established in educational research and literature. Thus, the novice must sell his study *and* himself, lest the experiment die abortively *sans* subjects. The writer found the following considerations of great help in gaining entrance to three excellent school systems for the purpose of conducting a study in reading.

Is the Study Controversial?

This factor outweighs all others in the matter of convincing the administrator that the experiment should be undertaken in his school. Virtually the first remark which should follow the usual social amenities is an assurance that the study is in no way controversial in nature, politically, or socially.

True scientist or not, the administrator has a duty to his public and must think of his own professional career. It hardly would be fair to ask him to subject his pupils or his faculty to an experiment which might prove objectionable to the community.

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Nothing controversial, nothing time-consuming, something useful—what is educational research coming to? But the situation is not as bad as this paper may imply. There are, of course, numerous areas in need of investigation which need not disturb administrators, teachers, pupils, or the public. And if your study is on the borderline, you may yet find some noble individual or group willing to aid the cause of research.

Will It Create Work for Staff Members?

Of only slightly less importance than the problem of controversial issues is the question, "Will this experiment create additional work for teachers or other members of the staff? The average administrator knows that his staff already is busy enough without assuming any additional tasks imposed by an experiment. This applies particularly to such routine tasks as the grading of papers. Therefore, once the administrator has been assured that the study is not controversial in nature, he should be told the extent of the demands that the experiment will make upon his staff of teachers and supervisors.

Will It Be Good for Something?

Because the school curriculum already is crammed with various requirements, there arises the question of squeezing in still another experience. The administrator may well ask, "Is this trip necessary?" or "What is there in it for us?"

The proponent of the experiment need make no sensational claims for the possible results of his experiment. Preferable is a modest appraisal of the potential educational implications plus the promise that a complete report of the findings will be forthcoming. If the offer is accepted, the experimenter should not fail to send the report.

It is altogether too easy to forget to submit the promised information, especially when it has taken months to compile the data and the experimenter now has accepted a position in some distant locality. The danger here is not to the in-

vestigator in question. He has his data. But the next individual who wants to use that school for an investigation may receive a cool reception.

How Much Written Preparation?

There is still another detail which will prove helpful in selling an experiment to an administrator. The student should provide a neat, simple outline of the study for the administrator, who may wish to study it or to present the idea to his superiors or to his school board, for approval.

In the case of larger school systems, where a screening board often is set up to judge the merits of proposed experiments, the student-researcher will find it helpful to provide a copy for each member of the board. Further, he should be prepared to supplement the written material with a concise verbal description of the study, including the various assurances mentioned.

Watch Your Research Manners

When the study has been approved, the student should make every effort to conduct his experiment with as little inconvenience to the staff and pupils as is possible under the circumstances. The experimenter should, at all times, play the part of the gracious guest. However, once the administration and the staff are in accord with the plan of the study, it also is fair to assume that the plan will be carried out with as little interruption on the part of the administration as is possible.

Only the normal appreciation shown to a friend or to any benefactor need be expressed upon completion of the study. The administrator and all those staff members involved in the experiment should receive thanks delivered in person, followed by a short note indicating that a complete report will follow and expressing further gratitude.

ENABLING RESEARCH TO ANSWER

(Concluded from page 62)

in increasing the intelligence of low ability children. Such research results are not fruitful unless other therapists can be trained to conduct similar types of educational activities and to achieve comparable results. Unless research findings can be translated into educational practice and verified, the research cannot be considered fruitful.

I would rather fail in a cause that will ultimately succeed than succeed in a cause that will ultimately fail.—Woodrow Wilson.

QUESTIONS EDUCATORS ASK

(Concluded from page 58)

How can safe and sanitary conditions best be assured in school facilities such as cafeterias, gymnasiums, and toilets?

What should secondary schools teach about narcotics?

The school athletic program has its full quota of technical questions of interest to teachers and administrators, plus many questions of concern to the general public. Our selection of two or three questions can give only a hint of the problems in this area:

What are the best administrative policies for a wholesome athletic program?

What is the best athletic program for girls?

What standards and policies are needed for interscholastic athletics?

Are there any questions, class? That, readers, is what is known as a rhetorical question.

In our particular dangerous era I would think that there are two things necessary for education: first, it must face ugly truths; secondly, it must afford children consistent, loving security, if not the consistent security of truth in all things. To accomplish these things the schools require in the first place a much more solid tie with the home and in addition they need the support of a sympathetic and understanding public.—James Marshall.

"We Should Do Some Research in Housing, Before the Situation Gets Bad."

—Adapted from *The Schoolmaster* (London).

The R's Have It—Either Way

By LESTER VANDER WERF[1]

FOR MANY YEARS parents, educationists, academicians, and other citizens have waged verbal warfare over the question: Are the Three R's taught better now than before? At present it seems clear to many of us that if they are not taught as well as they might be the country over, the reason is not because of modern methods but lack of them. (No harm can be done in admitting that our definition of "modern" is changing.) Too many schools still operate on the "drill-and-more-drill" formula. Instead of striking gold, as good prospectors should, teachers strike nerves like the dentist I had as a boy.

The furor about the fundamentals is hard to nail down. Evidence is wanted and needed. But some are not satisfied with the evidence we have. Some think the research is "loaded." A few give us the impression that they expect every young man and woman in America to read at Grade 14 level. But that's not all. These same youth should develop the mathematical wizardry of an Einstein, the writing talent of a Mann (Hemingway is too simple), the spiritual acumen of a Neibuki, and the social know-how of an Emily Post. Like Sand-Eye, the ostrich, the critics look in one direction while a community in another provides a high school education for 99 per cent of the youngsters of high school age.

READING

The mysteries of how children learn to read are rapidly being disspelled. The big blow over phonics has long since subsided. The modern teacher takes children of all kinds in his stride, keeps them in step with their level of development. He provides a series of stimulating experiences within their immediate environment. The children look and listen, talk and ask, do and feel, act and respond. And then they come home to tell the story:

"We saw a train. There were five cars. The conductor showed us the inside. John sat with the engineer. When the train left, the whistle blew."

Go into an elementary school near you and you'll probably discover that whatever the children are doing will be either directly concerned with words or with something from which applications of symbols can be made.

But, experience is primary, and one doesn't teach reading in isolation. Instead, the teacher develops a circular relationship among reading, speaking, listening, and writing, and experience. Anything else is phony and can be spotted in a minute.

Two extreme points deserve mention. For one, remedial reading programs can be justified only if something different from what made it necessary in the first place is planned. For the other, it is conceivable that in years to come children, although handicapped with T-V eyes, may nonetheless learn to read before attending school. Some do now. What then? Among other things, a new concept of readiness will be forced upon us. The 6.5 readiness age may be illusory.

WRITING

Like reading, speaking, and listening, writing can be taken from the circle and analyzed. Any normal observer knows that children start school with language patterns pretty well established. Thus, the time to study grammar has already passed. Literally thousands of teachers still believe that, by some magic, grammar of the rod and rule variety will remake people's writing or speaking patterns. Thirty years of research says it has not and will not.

A recent witness, a junior college teacher of English, admitted that after a year's concentrated study of such grammar, no improvement in students' writing was visible. But like the rats in Dr. Maier's mazes that went beserk attempting the same unworkable solutions to old problems, teachers, seeing students who cannot write, always come up with the same therapy. Such procedure leads only to better writhing, not writing. Hayakawa has developed the thesis that outmoded approaches to language do just that —place blocks in the nervous system, preventing mastery, understanding, and a positive attitude.

It can be stated categorically and indisputably that grammar has no place whatever below the ninth grade level and practically none thereafter.

How teachers can go through the same meaningless motions year after year *in the face of the evidence* is beyond comprehension. Again, there is no mystery—it is simply experience plus. The *plus* is so obvious that many never see it.

ARITHMETIC

An inspection of modern textbooks in arithmetic (all recent ones are not modern) will reveal interesting comparisons with those of twenty years ago. And they are evidence. Arithmetic has social *significance,* which means that it is useful in a variety of socially-acceptable ways: buying, selling, telling time, cutting

[1] Written on behalf of the Phi Delta Commission for Free Public Education, of which Dean Vander Werf is a member.

pies, etc. It also has *meaning*—it contains inner consistent relationships. Adding 28 and 27 is at sight 55 because two 20's and 15 (8 + 7) do it, or two 25's are 50 plus 2 left over and 3 left over. When, therefore, we begin with the socially significant in the primary years and almost simultaneously extract the meanings of numbers, we have a double set of relationships. Numbers are related to life and to each other. Good teaching throughout school days provides a continuous circular movement between the two with ever-increasing depth and breadth. Thus comes understanding, perhaps even wisdom.

Whose R They?

First and foremost, the Three R's are tools or means, but tools which have meaning. In a mobile, emerging society, they can lead to understanding. In this context they are power tools, and power is never to be taken lightly.

While the marvelous achievements of this nation are frequently attributed to an abundance of natural resources, material success in America has by no means been due solely to a great natural depository and a favored climate. Peoples and nations of other countries have likewise been so privileged but without equal result. American wealth and power are due not only to what our forefathers found here but to the qualities and efforts they have applied to their inheritance. The traits that have contributed so materially to our greatness as a people and as a nation are personal traits, traits that must be consciously formulated and cultivated. One of the purposes of the modern public school is to keep these traits productive and vigorously alive. Our philosophy of education does not regard the three R's as the whole of education, important though the tool subjects are and always will be. We place great emphasis upon initiative, self-reliance, creativeness, and imagination, all of which have meant so much to the material success we enjoy.—Herold C. Hunt.

The great majority of American youth, not entering college, must be reached in the high schools. Thousands of potentially good teachers must be found there, or be lost to the profession in the future. If intelligent counselling is lacking, and if high school students do not know the full facts about teaching, the building of a really adequate corps of teachers for the schools of the nation may never be realized.—Rees H. Hughes.

If America is to remain the *magnificently fragmented* society which we have been and which to a great extent we still are, if we are to preserve that splintering of authority which was the ideal of our forefathers . . . it is of supreme importance that we retain our private schools, colleges, and universities —even Harvard!—not merely as outmoded curiosities but as palpitating centers of freedom and cantankerousness.—Lynn White, Jr.

A MORE EFFECTIVE INSTRUMENT

(Concluded from page 66)

In the ideal situation, the research and operating units work in such harmony that all are in agreement on the research to be conducted and the steps to be taken when the research is completed. However, in actual practice, situations frequently arise when research reaches beyond the willingness or confidence of the operating units to proceed, or of the people concerned to support. Assuming that the research has been well conceived and executed, the report should be made available to those responsible for action. Further study of the proposals often leads to their adoption in whole or in part. Meanwhile the research staff will "sign off" and turn its attention to other areas of inquiry.

As time passes, the research units of state and local school systems will give less time to "trouble shooting" research and will be given larger resources to conduct continuing inquiries into the character and cost of education, and to inquiries designed to promote the continuing improvement of education.

People who have given thought to the matter will not hesitate to say that leisure time may be the most important factor in keeping a person mentally and physically healthy. These are the hours for refreshing your life with thoughts and actions that are foreign to those that fill your workday. A lawyer who rigged up a carpenter's shop in his basement had the right dea. "When I'm working in my shop," he said, "I lose all thought of worry and responsibility and my mind clears up like the air after a storm. I know it sounds silly, but when I finish something particularly fine, I feel as da Vinci must have felt when he looked at his Mona Lisa."

Are You on Borrowed Time?

Do you carry a membership card for the 45th fiscal year? If not, your membership is on borrowed time—your good standing expired on May 31, 1953, and your magazine address label is printed in green. Please note that the borrowed time will run out with the December issue of the magazine—unless your remittance reaches the Homewood office through your chapter, or direct, before the January mailing list is prepared on December 10th. But don't wait until December! Why not write your chapter at once and remit to cover your dues for the current fiscal year? See back cover of the magazine for the chapter address —if memory needs refreshing.

Keeping Abreast in Education

Φ The final appropriation for the Office of Education for the fiscal year ending June 30, 1954, restored all but $146,000 of the reductions made by the House. It included: the grant to land-grant colleges and universities for resident teaching, funds to cooperate with the VA in the administration of P. L. 550, and support for most of the continuing services of the Office of Education.

Φ The Eighty-Third Congress passed P. L. 141 authorizing films and related material for educational use to be transmitted through the mails at the rate provided for books. Regulations are now being issued by the Post Office, since the new rate is now in effect.

Φ Of the $6,100,000,000 spent in 1952-53 by local school districts for public elementary and secondary school operation, approximately 3 per cent came from Federal sources; 42 per cent from state sources, and 55 per cent from local sources, chiefly from general property taxes.

Φ In the Eighty-Third Congress, 270 educational bills of enough importance to be included in the American Council on Education's file of Federal legislation were presented. All bills not enacted or defeated hold over at their present status for the next session.

Φ School construction continued at a record pace during the past year. Contracts awarded for the construction of educational buildings during 1952 amounted to: $1,400 million for public elementary-secondary schools; $152 million for nonpublic elementary-secondary schools; and $248 million for colleges and universities. Even at this rate new classrooms for the public schools barely kept pace with the increase in enrollment due to the continuing high birth rate.

Φ The nation's 20,200,000 elementary school children go to approximately 128,225 schools of which 59,652 are one-room buildings housing several elementary grades, but enrolling only about 5 per cent of the elementary school pupils. Internally, 65 per cent of American elementary schools are organized with a grade or class assigned entirely to an individual teacher who is responsible for the children's total experiences or subjects each day. Increasingly, grades 7 and 8 are becoming part of a junior high school organization in which teaching is generally departmentalized.

Φ Currently, 3,165,900 adults are enrolled in some kind of vocational education program sponsored by public schools. About 3 million more adults participate in some type of evening or outside regular scheduled classes in community colleges, evening schools, adult education centers, and college extension courses. The trend is upward, both over-all and in 15 particular areas which were covered by a recent NEA survey. The two greatest increases occur in safety and driver education—up 535%; and in civic and public affairs education—up 428%.

Φ The nation's 1,889 recognized institutions of higher education enroll 2,400,000 students, about evenly divided between public and private institutions.

Φ A two-and-a-half-year study by the Office of Education of outstanding school systems reveals many significant trends. For example, an increasing number of schools in their day-to-day activities utilize community and regional resources. Pupils share in

THE EDUCATIONAL CALENDAR
1953 MEETINGS

National Conference of County and Rural Area Superintendents of Schools, NEA Department of Rural Education, Omaha, October 11-14, 1953.

United Nations Week, NEA Committee on International Relations and American Association for the United Nations, October 18-24, 1953.

American Education Week, November 8-14, 1953.

National Society for Crippled Children and Adults, Chicago, November 12-14, 1953.

National Conference on Driver Education, NEA Commission on Safety Education, East Lansing, Mich., November 15-18, 1953.

National Council for the Social Studies, NEA, Buffalo, November 26-28, 1953.

Annual Mid-Winter Conference, National Science Teachers Association, NEA, Boston, Mass., December 27-30, 1953.

Annual Convention, Speech Association of America, NEA, New York City, December 28-30, 1953.

Fourteenth Christmas Meeting, National Council of Teachers of Mathematics, NEA, Los Angeles, December 28-30, 1953.

1954 MEETINGS

American Association of Colleges for Teacher Education, NEA, Chicago, February 11-13, 1954.

American Association of School Administrators, NEA, Atlantic City, February 13-18, 1954.

National Association of Secondary-School Principals, NEA, Milwaukee, February 20-24, 1954.

Association for Supervision and Curriculum Development, NEA, Los Angeles, March 7-12, 1954.

Music Educators National Conference, NEA, Chicago, March 26-31, 1954.

planning their experiences, teacher-pupil relationships are becoming more democratic, and parents and teachers work together not only through formal parent-teacher organizations, but also informally.

Φ Thirty-five hundred delegates to the annual NEA convention attended the first public showing of "Skippy and the 3 R's," the third of a series of five public relations films produced by the NEA and the National Association of Secretaries of State Teachers Associations. The 29-minute picture dramatically shows how first graders learn to read, write and do arithmetic, and how they use the three R's as tools to understand, work and play. Prints are available at cost from the NEA Division of Press and Radio Relations.

Φ Those desiring an authoritative, practical, easily consulted source of information on the physical growth and charactistics and the emotional needs of children will find the "Child Growth and Development Chart" likely to meet their needs. Copies may be purchased from Arthur C. Croft Publications, 100 Garfield Avenue, New London, Connecticut, at 50c per chart, subject to special educational discounts for quantity purchases. Minimum order, $1.00.

Φ The 1954 Conference of the Association for Supervision and Curriculum Development will be held in Los Angeles, March 7-12, according to George W. Denemark, executive secretary. Although it had been announced earlier that San Francisco would be the convention city, difficulties in housing convention delegates necessitated the change. The annual conference will be held a month later this year to avoid conflict with second semester registration in colleges and universities.

Φ Francis Keppel, dean of the graduate school, Harvard University, H. B. Allman, Indiana University, and Philip Wardner, high school teacher, Garden City, N. Y., have been appointed to the National Commission on Teacher Education and Professional Standards.

Φ The first meeting of a new Commission on the Intermediate Unit of School Administration was held at the NEA headquarters, September 28-29. The Commission, recently authorized by the Division of County and Rural Area Superintendents of the NEA Department of Rural Education, will be composed of eight members. It will be assisted by an advisory council composed of one rural school administrator from each of the states. One of the principal functions of the commission will be to formulate policy on the development of administrative units.

Φ The Board of Directors of the National Science Teachers Association in its recent annual meeting expressed strong approval of President Eisenhower's stand on "book burning" and at the same time voiced sharp criticism of the situation involving the National Bureau of Standards and its director, Allen V. Astin. Later, Mr. Astin was given a clean bill of health and a promise of increased cooperation by the Secretary of Commerce, Mr. Sinclair Weeks.

Φ "Superintendents in Action" is the theme of the Eighth National Conference of County and Rural Area Superintendents scheduled to be held in Omaha, October 11-14. Among the topics to be considered by conference discussion groups are: how community needs shape action; services offered by the superintendent's office; improving the professional qualifications and preparation of county or rural area superintendents; and children's needs in rural education.

Φ The mushrooming of driver education programs in high schools and colleges throughout the country will be a major topic of discussion at the National Conference on Driver Education to be held at Michigan State College, East Lansing, November 15-18.

Φ William A. Early, superintendent of schools at Savannah and Chatham County, Ga., and new president of the National Education Association, addressed the National American Legion Convention in St. Louis, September 2, as one of the initial duties of his new office. He also represented the NEA at the annual meeting of the World Confederation of the Teaching Profession, Oxford, England.

Φ Karl H. Berns, assistant secretary for business, NEA, was appointed assistant secretary for field operations, effective September 1. In his new capacity, Dr. Berns will head the Association's field service program and direct NEA's $5,000,000 building fund campaign. His duties will include the scheduling of field assignments for the NEA president and other NEA staff members. Richard E. Carpenter, assistant superintendent of Montgomery County Schools, Rockville, Md., since 1947, has been appointed director of the NEA Division of Business.

Φ Two members of the National Commission on Teacher Education and Professional Standards have been reappointed to three year terms on the National Council for Accreditation of Teacher Education. They are Gladys Robinson, teacher, Lancaster, S. C., and C. O. Wright, executive secretary, Kansas State Teachers Association, Topeka.

Φ American Education Week will feature loyalty day on Monday, November 9, when adult groups from coast to coast will take the pledge of allegiance to the United States flag under the leadership of the school children in their communities. The 32nd annual observance is scheduled for November 8 to 14.

Φ Dr. Howard E. Wilson of New York City will become secretary of the Educational Policies Commission on November 1, 1953, succeeding William G. Carr. The Commission has been an influential voice in education since 1935. The Commission has declared that Communists should not be employed as teachers, that public schools should teach moral and

spiritual values without teaching sectarian religion, that citizen groups should exercise a larger influence in shaping local school policies, and that it is in the interest of the United States for its schools to provide informed and factual instruction about the United Nations and Unesco. Recent members of the Commission have been Dwight D. Eisenhower, James B. Conant, and Lee M. Thurston, newly appointed United States Commissioner of Education.

Φ The Executive Board of Unesco has approved construction of a headquarters building to be located in Paris on a site provided by the government of France, which will also advance an interest free loan to cover the costs of construction and equipment. The entire cost is not to exceed $7,140,000 and is to be paid off over a 30-year period. Plans call for two structures at the Place Fontenoy, near the Ecole Militairean auditorium and committee rooms for conferences, and an eight-story office building for the Secretariat.

Φ Dr. William W. Brickman, associate professor of education at NYU, has been named editor of *School and Society*. He succeeds Dr. I. L. Kandel, who has retired. A specialist in educational research, Dr. Brickman will continue as chairman of the history of education department in the NYU School of Education.

Φ Lloyd Morey, who became acting-president (his own choice of title) of the University of Illinois, on September 1, first went to the University as a student working his way. Now 67, he has devoted a lifetime of service to the institution, having been on the staff for 42 years and serving under five presidents. He is nationally known as an accountant and as a musician.

Φ "Good Schools Are Your Responsibility" will be the general theme of this year's American Education Week, scheduled for November 8 through 14. Sponsored by the National Education Association, the American Legion, the U. S. Office of Education and the National Congress of Parents and Teachers, the week is designed to turn the spotlight on the schools and foster more support of educational institutions by the public.

Φ William E. Lloyd, director of school-community relations for the Richmond, Virginia, public schools, has been appointed director of special services for the American Association of School Administrators (AASA). Mr. Lloyd began his new duties in Washington on September 15.

Φ The teaching of "6 R's" in our schools to meet the problems of modern life is reported by the Office of Education in a booklet, entitled "The 6 R's," which presents in text and pictures what parents now ask schools to teach their children.

In announcing the special publication, the Commissioner of Education said, "Many surveys agree that parents want their boys and girls to learn more than the traditional 3 R's. In addition to Reading, 'Riting, and 'Rithmetic, which more children today learn better than ever before, parents now want their children to learn about Responsibilities, Rights, and Relationships. They want our schools to teach boys and girls the duties of citizenship, how to make a living, and how to get along with others."

Copies of "The 6 R's" are available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Φ The following table indicates the growth in American education over the past year.

Public Elementary and Secondary Schools

	School Year	
	1951-52	*1952-53*
Number of classroom teachers:[1]	956,000	981,000
Elementary	627,000	646,000
Secondary	329,000	335,000
Enrollment:[1]	26,700,000	27,500,000
Elementary	19,500,000	20,200,000
Secondary	7,200,000	7,300,000
Average salary of classroom teachers[1]	$3,167	$3,405
Elementary	2,960	3,205
Secondary	3,561	3,795
Expenditures, public elementary-secondary, including capital outlay	$7,000,000,000	$7,500,000,000
New classrooms, with related facilities, completed	47,000	(est.) 49,000

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Institutions of Higher Education
(Publicly and privately controlled)

	Academic Year	
	1951-52	*1952-53*
Regular session resident enrollment	2,300,000	2,400,000 (est.)

Φ The sum of $50,000,000 in new funds for college housing loans has been released by the First Session of the 83rd Congress. There remains $13,500,000 from last year for the current fiscal year 1954. Thus there is available for fiscal year 1954 a total of $63,500,000. The requirement of a defense relationship on loans has been withdrawn by the Housing and Home Finance Agency. A new rate of interest (3.5 per cent), effective on all loans through December 31, 1953, has been announced by the Housing and Home Finance Agency.

Φ A complete list of educational publications issued during the past year was printed in the spring issue of the *Pi Lambda Theta Journal*. This list, compiled

[1] Advance estimates of Public Elementary and Secondary Schools for the School Year 1952-53 (prepared by Research Division, National Education Association for school years 1951-52 and 1952-53), rounded.

annually by the Education Department of the Enoch Pratt Free Library in Baltimore, has appeared since 1927, first in *School and Society*, and later in PHI DELTA KAPPAN. The compilers point out that in 1927, the first year of publication of this list, 221 titles comprised the output of educational books, and the average price per volume was $1.95. Last year 586 titles were issued, at an average price of $2.45 a volume. A short, selected list of the 50 outstanding educational books of 1952, also compiled by the Enoch Pratt Free Library, with the advice of 200 leading American educators, may be obtained for five cents per copy by writing to the Publications Department, Enoch Pratt Free Library, Baltimore 1, Maryland.

Φ Two hundred and forty-four TV channels are now reserved for education under the Federal Communications Commission's Sixth Report and Order of April, 1952. The total number of institutions (or groups) applying for these channels has reached 49. Of the 17 groups which have received their licenses one is already on the air. This is the University of Houston (Texas) station, KUHT. Other educational TV progress is shown in the following facts: Iowa State College has been operating Station WOI-TV on a commercial license, daily, for three years. Nearly 100 colleges and universities are putting on programs over nearby commercial stations. Ten institutions televise regular courses for degree credits. More than 65 school systems use TV in the classrooms and laboratories.

Φ Dr. Paul Witty, director of the Psycho-Educational clinic, Northwestern University, reports that televiewing by elementary pupils has increased on the average more than an hour a week since 1950, to a total of 22 hours a week, while the average for high school students increased from 14 to 17 hours a week during the same period. Witty's study of the TV habits of 3,000 elementary and high school pupils in the Chicago area, their parents and teachers, revealed that 28 per cent of the teachers and 30 per cent of the parents believe that TV is associated with such problems as increased nervousness, lack of time for recreation, and disinterest in school subjects. Thirty-eight per cent of the parents and 34 per cent of the teachers said that children in the elementary schools read less than before TV.

Φ The oldest educational journal in the country, *The Journal of Education*, has been purchased by Boston University and will be published monthly by the University's school of education beginning in October of this year. There will be eight issues per year. In its 78th year, *The Journal of Education* has been published continuously since its origin in 1875 under the auspices of the American Institution of Instruction and the Teachers Associations of New England. It was originated as a weekly devoted to science, education and literature. Although it has gradually come to emphasize elementary education, it also publishes articles on secondary school topics submitted by leading educators.

Φ Edward Kidder Graham, chancellor, The Woman's College of the University of North Carolina, Greensboro, has been elected president, Association for Higher Education. Three members named to the executive committee for two year terms include: Elsie Brenneman, director of admissions, Illinois State Normal University; Algo D. Henderson, professor of higher education, University of Michigan; and John Dale Russell, chancellor and executive secretary, New Mexico Board of Educational Finance.

Φ The Department of Classroom Teachers of the NEA, through its executive committee, has suspended its support of the Unesco Gift Coupon Plan in the United States. The action taken July 3, in Miami Beach, is explained in the following statement: "The Executive Committee believes in the Unesco Gift Coupon Plan in principle and has given it loyal and substantial support since its inception. This action to suspend its support was taken because of the continued and increasing dissatisfaction with its working relationship with the Unesco Relations Staff of the United States Department of State."

Φ Luther Harris Evans was elected Director General of Unesco in Paris, July 1-14, succeeding Jaime Torres Bodet of Mexico, who resigned last December. Mr. Evans told delegates of his lifelong fight against the enemies of liberty. "As Thomas Jefferson wrote in a letter of which I have been custodian for eight years, 'I have sworn upon the altar of God eternal hostility against all forms of tyranny over the mind of man,'" said Mr. Evans. "This means not only fierce defense of freedom but also proud pouring out of one's strength of mind and body for the enlargement of freedom, for breaking the shackles of ignorance and prejudice and injustice which hamper the innate upward thrust of the human spirit and make life poorer than it might be."

Φ A major project of the AASA is the cooperative program in educational administration, financed by an initial grant of $3,000,000 from the W. K. Kellogg Foundation at the request of AASA. Programs are currently in operation at Harvard University, Columbia University, University of Chicago, University of Texas, George Peabody College for Teachers, University of Oregon, and Stanford University.

Φ The Research Division of the Children's Bureau estimates that during the course of a year at least 100,000 children under the age of 18 are held in local jails or workhouses in this country. The estimate is based on a Bureau of the Census count for children found in jails on a single day in 1950 and on surveys made of detention in several states and communities. It is probable that the figure includes a number of neglected and dependent children who may have been housed in jails because no other facilities were available.

Φ The Menninger School of Psychiatry, Topeka, Kansas, well-known training center for psychiatry, has just enrolled one of its largest first-year classes. Forty-two graduate physicians from twenty states and three foreign countries, Canada, Puerto Rico and Egypt, began their three-year training program on July 1. This brings to ninety the total now enrolled in the School. Altogether, 335 physicians have enrolled in the Menninger training program since January, 1946. This represents nearly 5 per cent of all the psychiatrists practicing in the U. S. today. The Menninger School of Psychiatry is directed by The Menninger Foundation, a non-profit institution, devoted both to psychiatric education and to research into mental health and illness. The program makes use of the clinical facilities of Winter VA Hospital and Topeka State Hospital, together with a number of other state and local hospitals and clinics with a patient population of 3,700.

Φ The Department of Classroom Teachers, NEA, has elected Mrs. Nell B. Wilcoxen, elementary teacher, Phoenix, Ariz., as president; Ben Elkins, social studies teacher, Munhill, Pa., vice president; and Elizabeth Yank, elementary teacher, Marysville, Calif., secretary.

Φ A calendar of teacher association meetings of members of WCOTP, and issued by the latter organization, indicates that recruitment of teachers, salary schedules, pensions, and equal pay at the different levels are of almost universal interest. One of the most concrete convention programs was that of the Canadian Teachers Federation, in Montreal, August 10-15, which considered educational research, educational finance, teacher education, international relations, and the protection aspects of CTF.

Φ J. E. Wallace Wallin, one of the few living honorary members of Phi Delta Kappa and a charter member of Xi Chapter, University of Pittsburgh, has completed his seventh text, *The Education of Mentally Handicapped Children,* which appears in the *Education for Living Series* published by Harper & Brothers. Since his retirement in 1947 as Delaware State Director of Special Education and Mental Hygiene, Dr. Wallin has published two other texts, namely *Children With Mental and Physical Handicaps,* Prentice-Hall, 1949, and *Personality Maladjustments and Mental Hygiene,* McGraw-Hill, 1949.

Φ Nearly 30 per cent of last year's University of Illinois freshmen failed in the pre-registration proficiency test in English and were forced to take a high-school level, non-credit remedial course. This was revealed in a report submitted by the University's faculty committee on student English. According to Prof. Charles W. Roberts, director of Freshman rhetoric, who compiled the statistics, this is the highest percentage of failures in rhetoric placement tests of any class in recent years. The report shows that of the 2,178 students required to take the tests, 885 or 28.9 per cent failed. Only 23 students or 0.75 per cent were sufficiently good to be exempted from freshman rhetoric. Last year, 21.2 per cent failed and 1.6 were proficient enough to be exempted. Says the report: "Each year, a higher percentage of freshmen fail the pre-registration proficiency test in English. . . . The task of maintaining competence in written English is becoming more and more difficult." Salaries for rhetoric instruction costs $44.54 per student.

Φ "The prospects for total student enrollment for 1953-54 appear considerably more favorable than at any time since 1950," says the American Council on Education. Among the factors which will increase enrollment are: The number of high school graduates this spring (1,205,000) is approximately 20,000 more than last year; the proportion of graduates going on to college has continually increased, indicating greater motivation toward procuring a college education; opportunities for jobs for high school graduates appear somewhat less favorable now than a year ago in terms of continuous employment; relatively few nineteen year olds are, as yet, being inducted; approximately 100,000 veterans will be enrolled this fall under P. L. 550; and such assistance to veterans will make it financially possible for some parents to finance a college education for other members of the family who are not veterans.

Φ In Urbana, Illinois, where Abraham Lincoln once ran a foot race in the street (local records indicate Abe won), the University of Illinois dedicated on June 20 a special Lincoln Room in the University library, devoted entirely to its collection of Lincolniana. Nucleus of the Lincoln collection is the 3,000 volumes and papers recently donated by Dr. and Mrs. Harlan H. Horner as a Class of 1901 memorial. Before his retirement, Dr. Horner was associate commissioner of higher education of the State of New York.

Φ Tuition free scholarships for outstanding Ohio high school graduates to study elementary teaching in the College of Education, Ohio State University, has been announced. The cost of educating a pupil in Ohio's school districts continued to climb last year as they have each year since 1947-48, the earliest year studied. In Ohio's city school districts, the average current expense per pupil last year was $232.72, an increase of $13.45 over the previous year's figure. For the county districts, the current expense average was $192.62 for each pupil, a gain of $19.53 from the preceding year; in exempted village districts, current expenses averaged $186.49, up $9.00 from 1950-51 average. In the eight Ohio cities with more than 100,000 population, current expenses ranged from $198.93 to $271.81, with an average of $245.59 per pupil.

Φ The annual "improvement factor" has become a recognized part of wage negotiations and collective bargaining in industry. Contributing to the "improvement factor" are higher skills, better mechanical

equipment, and better quality of raw materials, resulting in fewer rejections of output, and better management. Education, too, has a claim on "productivity." The public schools have been responsible for developing a generation of industrial workers more literate than ever before, more able to get along with people, and equipped with better work habits. In short, it is quite likely that increased productivity reflects the efforts of education, and if so, education is entitled, also, to a share of the annual "improvement factor."

Φ An internship program for prospective college teachers has been inaugurated this fall at the University of Minnesota on a $50,780 grant from the Ford Foundation's Fund for the Advancement of Education. Ten internships, each carrying a stipend equivalent to an instructor's salary for one academic year, will be made available to advanced graduate students. The program will be administered through the University's graduate school by a faculty committee. Students accepted for the pilot program will serve as full-time "interns" for one academic year. They will work under close supervision of a faculty sponsor, each student carrying some definite teaching responsibilities. Full resources of the University will be utilized, allowing the group to become familiar with such things as visual aids and counseling procedures.

Φ A significant step, that of launching a full time student teaching program for seniors, has been announced by National College of Education, Evanston, Illinois. The move is described as part of the college's plan of developing more adequate methods of preparing future elementary teachers for the nation's classrooms. The college has studied and experimented with various plans for full time student teaching for the past several years. The full time student teaching program will get underway this fall with the semester divided into two nine-week periods. Students enrolled in the pilot course will spend the first nine weeks teaching full time in an off-campus elementary school and the second nine weeks in concentrated study in college classes.

Φ Unesco reports that perhaps the most surprising and rapid growth of television in the world is taking place in Latin America. Something like a television "fever" is sweeping across most of the Latin republics, Unesco said in publishing the results of a world survey of television in its March issue of *Courier*. Other highlights include: The United States has made the greatest development in TV, with more than 20 million sets in use. Britain, the first country to telecast regular programs, in November, 1936, the survey adds, now has five powerful stations covering more than 80 per cent of the country with more than 1,700,000 sets in use. Three stations serving about 60,000 receivers are in operation in Russia, in Moscow, Leningrad and Kiev. France has 60,000 sets in use with new ones selling faster than industry can produce them at a rate of 6,000 a month.

Φ The Eighteenth Education Conference, sponsored jointly by the Educational Records Bureau and the American Council on Education, is scheduled for the Roosevelt Hotel, New York City, on October 29 and 30. The theme of the conference is "Strengthening Education at All Levels."

Speakers include: Harry J. Carman, Columbia College; Harry D. Gideonse, Brooklyn College; Helen Blair Sullivan, Boston University; Paul L. Dressel, Michigan State College; Jacob S. Orleans, City College of New York; Ralph Steetle, JCET; Robert T. Rock, Fordham University; Robert L. Thorndike, Columbia University; C. Winfield Scott, New Haven State Teachers College.

Φ New York University's School of Education will offer a new graduate curriculum in hospital recreation, beginning with the fall (1953) term. The group of courses, to be conducted in the department of physical education, health, and recreation, will train graduates to inaugurate and carry out recreation programs in custodial institutions, hospitals, homes for the aged, and rehabilitation centers.

Φ In culmination of years of thought and planning, the faculty of Princeton University unanimous recommended to the board of trustees that a Council of the Humanities be established to strengthen teaching and research in this area. The proposal was described by President Harold W. Dodds as "one of the most significant developments" in Princeton's recent history. The purpose of the proposed Council is to strengthen the role of the humanities in the University as the preservers of tradition, the recorders and the defenders of the values by which men live, the repositories of the experience and knowledge of great culture and of the behavior of man as an individual and a member of society.

Φ Proposals to reorganize governmental agencies submitted to the Eighty-Third Congress were not opposed and consequently were authorized. The two of most direct interest to education are: the creation of the Department of Health, Education and Welfare, and the reorganization of the State Department. The status of the Office of Education within the new Department is virtually unchanged from that in the Federal Security Agency. The Mutual Security Agency and the Technical Cooperation Administration are fused into a new organization, Foreign Operations Administration; the Voice of America is also within FAO but is under the jurisdiction of a separate administrator; the Fulbright, Smith-Mundt and similar student, teacher, and faculty exchange programs will continue in the Department of State.

Φ Two factors may deter some students from enrolling in college this fall. One is the continually increasing cost of higher education to the student. A study made by the Central Association of Business Officers indicates that 85 of the 198 four-year private institutions included in the report are planning a further increase in student fees this fall which will

average approximately 12 per cent; all but four had increased their fees during the previous decade an average of 78 per cent. Of the 160 public institutions, 129 plan a further increase in fees for resident students averaging approximately 19 per cent in addition to an average increase in 123 institutions of 65 per cent during the previous ten years; 131 plan to increase non-resident fees which had already been a little more than doubled during the decade 1942-43 to 1952-53. The second is the fact that a high school graduate who goes immediately into military service is eligible for educational benefits under P. L. 550 when he returns. No reliable estimates of the impact of either of these factors are available. In balance, it appears that if no substantial changes in Selective Service or ROTC policies are made during the summer, enrollment this fall will increase approximately 10 per cent above last year. By 1957-58, college enrollment, if not affected by total mobilization, will probably reach 3,000,000. It will continue to rise to a level of approximately 4,000,000 by 1965-66.

Φ An educational television project in which more than twenty universities will participate has been announced by officials of the schools concerned and CBS television network. It will consist of a weekly series of filmed programs showing research activities at various universities. The programs, starting October 1 and continuing at least twenty-six weeks, will be entertaining as well as educational. The title of the series is "The Search." Officials of the participating universities think the series will promote a better understanding of higher education.

Among projects to be covered is the University of Minnesota's research on a group of 300 middle-aged men to determine what causes heart disease and how it can be prevented. Four of the original group have died since the project started—three of heart disease and one in an airplane crash—and eleven others have been stricken with serious heart ailments. Universities and colleges thus far scheduled to participate in the series are: Pennsylvania, Michigan, Chicago, Minnesota, Iowa, Louisville, North Carolina, North Carolina State, Dartmouth, Ohio State, Massachusetts Tech., Colorado School of Mines, Utah, Washington, Northwestern, and Pennsylvania State.

Φ Leland S. Hobson, Professor of Industrial Engineering, Kansas State College, says: "For too long a time we have been trying to see safety on the basis that it is the economical thing; it reduces man-hours of lost time; it may save the life and limb of your own child or yourself. It seems to me that it is time that we make clear to people that safety is a moral issue and that it is just as immoral for a person to resort to unsafe practices as it is for a person to resort to robbery or murder. 'Thou shalt not kill' is just as much a law for car drivers, for plant managers, for building designers as it is for bandits. . . . Any man who steps into the driver's seat of a car, or accepts the management of a plant, or undertakes the design of a highway system, or of a home, has accepted the responsibility for carrying on his task without endangering the lives and happiness of other people."

Φ Last year marked the tenth anniversary of the United Negro College Fund, the nation's first educational community chest. The private Negro colleges were the first to introduce the formula of cooperative fund-raising in support of privately endowed education—the United Negro College Fund. Today this method of educational financing has grown into a national movement, with some 24 groups of private colleges throughout the country organized in cooperative college funds, patterned after the UNCF. By staking their meagre resources on a wholly new and untried idea in 1943, and by demonstrating the soundness of their approach to voluntary support of free higher education through nine annual nationwide campaigns, the private Negro colleges have contributed greatly to the future strength and security of all of the nation's independent colleges and universities.

Φ The first Benjamin Franklin Magazine Awards, to be administered by the University of Illinois, will cover the work of the calendar year 1953, and will be announced in April, 1954. Eight awards will be given annually, as follows:

For the most distinguished and meritorious public service during the year by an American magazine of general circulation, a gold medal presented to the editor; for the most distinguished magazine writing involving original reporting in which serious obstacles had to be overcome, one thousand dollars ($1,000) to the writer; and six others carrying cash awards of $500 each: the best article, or series of articles, depicting life, culture or institutions in the United States; the best interpretation of the foreign scene or of our foreign relations; the article best depicting a person, living or dead; the best piece of magazine humor; the best short story; and an outstandingly meritorious presentation is any category not covered by the other awards.

Φ Eli Lilly and Company, Indianapolis pharmaceutical house, has established a post-doctoral research fellowship in the University of Notre Dame's department of chemistry for the coming year. The Lilly fellowship provides funds for research on "New Approaches to the Synthesis of Folic Acid." The research will be conducted by T. L. V. Ulbricht of Bristol, England, under the direction of Dr. Charles C. Price of Notre Dame's chemistry department.

Φ The Michigan Picture Test, the first personality measure for ages 8 to 14 with an objective rather than subjective method of scoring, was introduced by Science Research Associates at the 61st Annual Convention of the American Psychological Association September 4-9. The Michigan Picture Test, a projective test similar to the Thematic Aperception

Test, the standard personality measure for adults, is reserved for clinical use. Other new SRA measurement tools which had their first convention showing include the Minnesota Tests on Household Skills, the Kuder Combined Profile, and the 1953 revision of the Primary Mental Abilities, Ages 5-7. The SRA Educators Opinion Inventory and the SRA Employee Inventory, morale measurements for school systems and industry, respectively, and which have gained nation-wide attention during the last year, were available for study.

Φ In their search for new vitamins and growth factors, biochemists at Oregon State college have discovered a compound that doubles bacteria growth during the first 12 hours of life and which may have a role in human and animal nutrition. How important glucosyl-glycine may be in human growth is as yet undetermined but its "quick growing-up" effect on bacteria is remarkable. Compound-treated organisms are as large in 12 hours as they normally grow in the first 24. After three days, the two groups are the same size, an indication that in time the bacteria produces the growth factor itself but cannot do it at first. The research is one of the original projects of the Science Research Institute, which was established at OSC last year.

Found in liver, yeast, milk and other foods, the compound is made in the laboratory by condensing glucose with glycine, a common amino acid of meats and other protein foods. The homemaker probably produces the compound every time she bakes bread or makes a stew, since the inter-action of the chemicals proceeds easily at cooking temperatures. If the compound is shown to be beneficial, it may be a basic explanation of one of the values of cooking food. The search for new vitamins project is supported by funds from Swift & Company and the Nutrition Foundation.

Φ Graham Hovey, associate professor of journalism and commentator on the "Background of the News" over Station WHA and the Wisconsin FM network, has been awarded a special Fulbright research grant for travel in Italy. He will be one of three representatives in Europe of the National Association of Educational Broadcasters (NAEB), of which WHA and the Wisconsin network are a part. The other two NAEB representatives will be Howard Kreschkopf, of the Lowell Institute Co-operative Broadcasting Council in Boston, who will go to France, and Burton Paulu, director of Station KUOM at the University of Minnesota, Minneapolis, who will go to Britain.

The program is part of a two-way exchange between the American educational network and the national radio-TV networks of the three European countries. A representative of Italian radio will come to Purdue University in Lafayette, Ind., and a representative of the French network will be stationed at Iowa State College, Ames. NAEB hopes to provide a third grant at a university site of one of its member stations for a radio or television specialist from the British Broadcasting Corporation.

Φ Teachers with questions about federal income tax deductions may find answers in a series of memoranda published by the Research Division of the NEA. The series, prepared as a personal guide to teachers, presents some of the special rulings published by the Federal Bureau of Internal Revenue, court cases, and other information to help teachers determine deductible expenses.

Among the topics presented in the series are: educational expenses, gifts, awards, scholarships, fellowships; pensions and retirement annuities; professional expenses; professional services; temporary employment and sabbatical leave. Copies of these memos are available from the Research Division. In cases where a specific problem is not covered by previous rulings, teachers may write directly to the Director of Internal Revenue in Washington, D. C. Teachers who request special rulings from the Bureau of Internal Revenue are urged to share their information with the NEA Research Division.

Φ Boys and girls are surrounded by the gadgets science of hot-rods, atomic ray guns, and space ships but an increasing number of students are passing up their school science programs because they think the classes are dull. Science teachers hope to remedy this through the 1954 program of science achievement awards which will open this month, Robert H. Carleton, executive secretary of the National Science Teachers Association, announced. The annual awards programs, conducted by NSTA, a department of the NEA, and sponsored by the American Society for Metals, is open to junior and senior high school science students in public, private and parochial schools. The Association will also give recognition awards this year to science teachers for outstanding work. Information about the awards program may be obtained from NSTA, 1201 Sixteenth St., N. W., Washington 6, D. C.

Φ Helen Clapesattle, senior editor of the University of Minnesota Press, became director effective July 1, succeeding Mrs. Margaret S. Harding who retired June 30 after heading the publishing branch of the University since 1927. Miss Clapesattle is the author of *The Doctors Mayo*, a biography of the famed Rochester surgeons which has been the all-time best seller among books published by the University of Minnesota Press and which has been translated into four other languages.

Φ The University of Houston apparently won the race for being the first 100 per cent educational television station. It went on the air early in June.

Φ Bethlehem Steel Company has announced an offer of financial aid to privately endowed colleges and universities which turn out men who go into Bethlehem's training program.

The plan "approaches the problem of aid to education from a new standpoint," said E. G. Grace,

the company's chairman. "The novel feature is that it provides for financial assistance to the selected colleges on the principle of value received."

The company is offering help to 45 institutions in proportion to the number of their men who are selected by Bethlehem in its annual graduate training program, known as the Bethlehem Loop Course. Amount of the payment for each graduate has been set at $3,000. Each year more than 100 men are chosen for the Bethlehem Loop Course, which was founded 30 years ago.

Φ More than 7,000,000 children, or 28 per cent of all public school pupils, are transported to and from schools daily in the now familiar "school bus." These transport over four times as many pupils each school day as the total number of passengers carried in inter-city travel by the nation's railroads and commercial bus lines combined. One of the major effects of modern school transportation is improvement in the attendance in rural schools, which now averages 86.9 per cent as compared to 85.7 per cent for urban schools.

Φ Dartmouth College has acquired the world's greatest library on the polar regions, assembled during thirty years by the Polar explorer Vilhjalmur Stefansson. This acquisition gives to the college a vital research tool to be used in connection with its Northern Studies Program, now getting under way. The Stefansson collection contains 25,000 volumes, 20,000 pamphlets and many valuable manuscripts dealing with the Arctic, the Antarctic and the permafrost areas of the world. It includes information on the science, music, history, linguistics and folklore of these regions. A large amount of unpublished material dealing with the northern frontier is included. The collection has been used extensively by the United States military services in the compilation of Arctic manuals and guide books.

Φ Private philanthropy for higher education appears to have reached a new high level in 1951-52, according to a study of gifts and bequests to fifty-one major colleges and universities, made by John Price Jones Company, consultants and managers for institutional financing. Current gifts received by the colleges under study totaled $91,062,000, the largest amount reported in any single year.

Φ Union College (Schenectady, N. Y.) increased salaries of its faculty members, effective July 1. The move establishes faculty floors at $4,000 for assistant professors, $5,000 for associate professors and $6,000 for full professors.

Φ Florida voters approved a constitutional amendment earmarking the proceeds of automobile license fees, for the next thirty years, for school construction. The State Board of Education may issue revenue bonds to provide this aid immediately.

Φ A study made in Brookline, Massachusetts, showed that while various citizens groups placed teaching jobs high in importance, not one parent said he would choose a teaching career for his son. About 20 of the 70 chose the teaching profession for the daughter of the family.

Φ A collection of 150 facsimile reproductions of drawings by Leonardo da Vinci is available at a small fee through Thomas Meachem Exhibit Headquarters, American Federation of Art, 5th Avenue, New York, N. Y.

Φ The $1,000,000 three-story Kresge Science Library, first Wayne University structure to be financed by private philanthropy, was dedicated on May 14.

Φ From Joseph Pincus (Rho 1375) comes the following list of books for those thinking of teaching as their future.

1. Anthology: *The Schoolmaster in Literature,* Introduction by Eggleston.
2. Borzum: *The Teacher in America.*
3. Church, Virginia: *Teachers Are People.*
4. Dudley, Pauline: *"I'm Glad I'm a Teacher"* N.E.A. Journal, November, 1949, 578.
5. Eggleston, Edward: *The Hoosier Schoolmaster.*
6. Fuess, C. M. & Basford, E. S.: *Unseen Harvest.*
7. Highet, Gilbert: *The Art of Teaching.*
8. Hilton, James: *Goodby, Mr. Chips.*
9. Hilton, James: *David Blaize.*
10. Hubbard, Elbert: "Little Journeys to the Homes of the Great," Vol. 10, *Great Teachers.*
11. Hughes: *Tom Brown's School Days.*
12. Nelson, Joseph: *Backwoods Teacher* (Big Piney River in the Ozarks).
13. Perry, Bliss: *And Gladly Teach.*
14. Peterson, H.: *Great Teachers.*
15. Scott, V.: *The Hickory Stick.*
16. Stuart, Jesse: *The Thread That Runs So True.*
17. Thompson, D'Arcy W.: *Day Dreams of a Schoolmaster.*
18. Van de Mark, Theodore Jane: *"A Prayer for Bill."* N.E.A. Journal, November, 1949, 634.
19. Wells, H. G.: *The Story of a Great Schoolmaster.*

Φ The first use of public money to carry farm children from their homes to school occurred in 1869, in Massachusetts. Today, 7,300,000 children are carried in buses, station wagons, and passenger cars over both first class and farm roads to elementary and secondary schools. It is a big business and an expensive one: 120,000 vehicles; 120,000 drivers, most of them working part time; thousands of maintenance workers with a total cost of more than $200,000,000 per year, or an average cost of $29 per year for each child using school transportation services. Today, two-thirds of the school vehicles are publicly-owned; one-third, privately owned. This change took place during the last 15 years; in 1937 the proportions were exactly the reverse. Many additional uses for the "school bus" have been found, including providing new teachers with an overview of the community in which they are to teach.

S-R BONDS

Kind Words Can Never Die

Since leaving the University I have experienced a "lost" feeling professionally, and if it were not for PHI DELTA KAPPAN I would go stale. No other magazine of the profession has its quality and standards. I don't get to read every word of every issue, but if I don't someone else around me does.—Willis H. Hight (Beta Rho 134).

PHI DELTA KAPPAN, most interesting and enlightening magazine I have ever read. Thank you for the service you are rendering.—John A. Scott (Gamma Alpha 43).

Our magazine is a mine of rich values.—Leon L. Tyler (Omega 152).

Congratulations for the fine job you are doing with PHI DELTA KAPPAN.—Robert B. Kamm (Eta 1105).

With Untold Dismay

After reading (with untold dismay) your editorial in the April issue of the PHI DELTA KAPPAN, and in view of my inability to find the words that would adequately express what is in my heart, I am taking the liberty of enclosing a copy of *The Nation* (which you need not return), with the earnest request that you read those articles I have indicated with the red pencil. The ideas expressed in these articles more than adequately reflect my sentiments respecting the Inquisition now gripping this country; an Inquisition that differs from the Spanish Inquisition only in time and place; an Inquisition that you advocate include American schools and colleges. Incredible! I can hardly hope that upon sober reflection, after reading these articles, your attitude will undergo any change.—Don J. Miller (Alpha Mu 1701).

What if FBI Reports Are Disregarded?

I certainly concur with the views expressed by Mr. Keesecker. (See May, 1953, *School Life*.—Ed.) But the protection of our Republic lies in the hands of the Department of Justice and the FBI, not in the hands of power-hungry, publicity-seeking congressmen, who will do more to weaken this Republic than strengthen it. I can sum up my sentiments rather well by quoting Wendell Willkie: "Whenever we take away the liberties of those whom we hate, we are opening the way to loss of liberty for those we love."—Don Miller (Alpha Mu 1701).

Should Not Ask Special Privilege

Again it is my privilege to congratulate you upon PHI DELTA KAPPAN. In this (April) issue, I particularly like your editorial "Let's Call Our Shots." I have been of the opinion for sometime that we in education should not set ourselves aside for any special privileges nor assume that we are above question. If anyone can find subversives in our ranks, we should be grateful for that service and clean house. I liked what you said about making the investigation a fair one rather than destroying the method entirely.—E. G. Toland (Alpha Epsilon 629).

Provocative Subjects Challenge

The April PHI DELTA KAPPAN arrived yesterday. . . . I sat down and read the whole issue straight through. Each article was so appealing that I kept on going until I had finished them all. This I had never done before. Articles about research performed are of course necessary and sometimes interesting, but too many of them make for dull reading. Provocative and controversial subjects challenge our thinking.—W. Carman Lucas (Phi 1258).

Classes on Stair Landing!

I don't place too much value in popularity as an indicator of good public school administrative ability. The ranks of Rotary, Kiwanis, et al, are full of popular school men; a few are educators. . . . To me it is ludicrous—these large, comparatively new gymnasiums built onto small, inadequate high schools. . . . Recently, I spoke at a high school career day in a marvelous gym—popular superintendent, too. In the adjoining school building they are holding commercial classes in a partitioned off stair landing!

I wouldn't want to tarnish the lustre of what is obviously a popular school man, but does John Hughes (See May Cover) really have "it"—big IT? Maybe I've been advocating the wrong things in educational administration. Maybe that is why I am in college work. I think I'll write to my friend Clarence Long at Slippery Rock and see what he says.—J. Sherrick Fisher (Xi 742).

Impression Not Ephemeral

My tardiness in congratulating you upon the February issue will at least indicate that the impression made was not merely ephemeral. There was much good sense in your "Editorial Comment," and I enjoyed particularly two articles, "Human Relations in Administration," and "Is Your Enthusiasm Showing?"—Louis Foley (Beta Eta 14).

More Enjoyable Readings

I have encountered two more delightful books that definitely belong on any supplemental list of "Enjoyable Readings in Education." They are *Snips and Snails* by Louise Baker and *Family Album* by Antonia Ridge. Both are written by teachers and about teachers.—Ralph E. Dunham (Lambda 1561).

Succeeded Beyond Optimistic Hopes

I am very proud to have shared in your program this past year, the more so because you have succeeded beyond my most optimistic hopes. The quality of the articles has been outstanding, the variety a welcome indication of the responsibility of our fraternity for democratic education, and the presentation has been uniformly excellent.

Every letter I receive commenting on my articles usually links my writing with other items in the same issue or earlier issues. This is a good sign that you are on the right road and that reforms may result from our joint work.—Ray Montgomery (Zeta 1586).

Board Member Interested

The April 13 issue of *Public Relations News* mentions the special school community relations issue of PHI DELTA KAPPAN. As a member of our school board out in Long Island, I have a great deal of interest in educational public relations. I would appreciate having one or more copies of your book.—John P. Brion.

FRATERNITY DIRECTORY

Campus Chapters

Chapter	*Location*	*Secretary*	*Mailing Address*
Alpha	Indiana Univ.	Raymond S. Butler	c/o Mrs. Carol L. Schaerer, 1105 S. Washington, Bloomington, Ind.
Beta	Columbia Univ.	Richard Bergmann	Box 611, 525 W. 120th St., New York 27, N. Y.
Gamma	Univ. of Missouri	J. O. Keller	101 Rothwell Gym., Univ. of Mo., Columbia, Mo.
Delta	Stanford Univ.	Gerald W. Brown	409-8 Village, Stanford, Calif.
Epsilon	St. Univ. of Iowa	Desmond L. Cook	179 Riverside Park, Iowa City, Iowa
Zeta	Univ. of Chicago	Tobias Enverga	1414 E. 59th St., Chicago 37, Ill.
Eta	Univ. of Minnesota	Harold G. J. Gerritz	211 Burton Hall, Univ. of Minn., Minneapolis 14, Minn.
Theta	Cornell Univ.	Orville E. Thompson	Stone Hall, Cornell Univ., Ithaca, N. Y.
Iota	Harvard Univ.	Wendell French	Lawrence Hall, One Kirkland St., Cambridge 38, Mass.
Kappa	Univ. of Kansas	William Butler	120 Fraser Hall, Univ. of Kans., Lawrence, Kans.
Lambda	Univ. of California	Robert J. Griffin	Haviland Hall, Univ. of Calif., Berkeley 4, Calif.
Mu	Univ. of Texas	John A. Cook	116 Sutton Hall, Univ. of Texas, Auston, Tex.
Nu	Univ. of Washington	Francis F. Powers	230 Education Hall, Univ. of Wash., Seattle 5, Wash.
Xi	Univ. of Pittsburgh	Paul L. Varnum	1655 Memorial Dr., Pittsburgh 16, Pa.
Omicron	Univ. of Nebraska	W. C. Meierhenry	305 Tchrs. Col., Univ. of Nebr., Lincoln 8, Nebr.
Pi	Univ. of Illinois	Lloyd E. McCleary	109 Univ. H. S., Univ. of Ill., Urbana, Ill.
Rho	New York Univ.	Joseph Grimes, Jr.	One Stevenson Rd., Hewlett, L. I., N. Y.
Sigma	Ohio State Univ.	Stephen M. Clarke	120 Arps Hall, Ohio St. Univ., Columbus 10, Ohio
Tau	Univ. of Pennsylvania	Daniel S. Jacoby	3302 Tilden St., Philadelphia 29, Pa.
Upsilon	Northwestern Univ.	Joseph D. Boyd	526 Greenwood, Evanston, Ill.
Phi	Univ. of Wisconsin	Robert L. Mooren	Box 50, Ed. Bldg., Univ. of Wis., Madison 6, Wis.
Chi	Univ. of Oregon	Douglas J. Adams	2773 Kincaid, Eugene, Ore.
Psi	Peabody Col. for Tchrs.	Gilbert M. Wilson	Box 212, Peabody Col., Nashville 5, Tenn.
Omega	Univ. of Michigan	John B. Hawley	4203 Univ. H. S., Univ. of Mich., Ann Arbor, Mich.
Alpha Alpha	Univ. of Oklahoma	F. Lowell Jackson	Fac. Exch., Univ. of Okla., Norman, Okla.
Alpha Beta	Univ. of Virginia	Frank E. Flora	Peabody Hall, Univ. of Va., Charlottesville, Va.
Alpha Gamma	St. Col. of Washington	Clarence D. Kron	Sch. of Ed., St. Col. of Wash., Pullman, Wash.
Alpha Delta	Kansas St. Col. of Agri.	D. F. Showalter	Dept. of Ed., Kans. St. Col., Manhattan, Kans.
Alpha Epsilon	Univ. of So. Calif.	Francis Laufenberg	Box 160, Univ. of So. Calif., Los Angeles 7, Calif.
Alpha Zeta	Univ. of Arizona	Angel H. Tellez	36 S. Grande, Tucson, Ariz.
Alpha Eta	Temple Univ.	Mario DaRos	Box 141, Temple Univ., Philadelphia 22, Pa.
Alpha Theta	Univ. of North Dakota	Carl Peterson	505 Maple Ave., Grand Forks, N. D.
Alpha Iota	Univ. of Cincinnati	Omer W. Renfrow	850 Ludlow Ave., Cincinnati 20, Ohio
Alpha Kappa	Univ. of Tennessee	Robert Fleming	218 Ayres Hall, Univ. of Tenn., Knoxville, Tenn.
Alpha Lambda	Boston Univ.	Joseph Comerford	332 Bay State Rd., Boston 15, Mass.
Alpha Mu	Colorado St. Col. of Ed.	W. L. Knies	Colo. St. Col. of Ed., Greeley, Colo.
Alpha Nu	Univ. of Kentucky	James Graham	Col. of Ed., Univ. of Ky., Lexington, Ky.
Alpha Xi	Univ. of Alabama	James E. Wheeler	P. O. Box 123, University, Ala.
Alpha Omicron	Claremont Col.	Edward W. Malan	118 Oak Park Dr., Claremont, Calif.
Alpha Pi	Rutgers Univ.	Patrick J. White	507 Alletta St., Plainfield, N. J.
Alpha Rho	Johns Hopkins Univ.	Albert H. Naeny	2003 Lydenles Way, Baltimore 14, Md.
Alpha Sigma	Denver Univ.	George R. Villano	3071 W. Clyde Pl., Denver 11, Colo.
Alpha Tau	Pennsylvania St. Col.	Frank Anthony	230 E. Whitehall Rd., State College, Pa.
Alpha Upsilon	Univ. of Utah	E. T. Demars	2552 Alden St., Salt Lake City 5, Utah
Alpha Phi	Syracuse Univ.	Carson Graves	200 Slocum Hall, Sch. of Ed., Syracuse Univ., Syracuse 10, N. Y.
Alpha Chi	Univ. of Calif. at L. A.	Alfred Quinn	c/o Dept. of Ed., UCLA, Los Angeles 24, Calif.
Alpha Psi	Univ. of Buffalo	Elton W. Peterson	160 Frankhauser Rd., Williamsville 21, N. Y.
Alpha Omega	Wayne Univ.	Elmer H. Miller	436 W. Woodland Ave., Ferndale 20, Mich.
Beta Alpha	Louisiana St. Univ.	C. L. Madden	Box 8729 L.S.U., Baton Rouge, La.
Beta Beta	North Texas St. Col.	Everett E. Jarboe	N. T. Station 5281, Denton, Texas
Beta Gamma	George Washington Univ.	Joseph B. Reid	4914 S. 29th Rd., Arlington, Va.
Beta Delta	Univ. of Colorado	William J. Walsh	Col. of Ed., Univ. of Colo., Boulder, Colo.
Beta Epsilon	Univ. of Maryland	Bernard I. H. Kraemer	4511 Norfolk Ave., Baltimore 16, Md.
Beta Zeta	Oklahoma A & M Col.	Robert S. Dotson	227 Whitehurst Hall, Okla. A & M, Stillwater, Okla.
Beta Eta	Western Michigan Col.	James E. Fetterolf	Box 62, Richmond, Mich.
Beta Theta	Univ. of N. Carolina	John R. Peck	Box 1051, Chapel Hill, N. Car.
Beta Iota	Washington Univ.	Meriwether Martin	4335 Cote Brilliante, St. Louis 13, Mo.
Beta Kappa	Iowa State College	Ronald R. Easter	301 S. Hazel Ave., Ames, Iowa
Beta Lambda	Indiana St. Tchrs. Col.	Lonzo Jones	2700 N. 7th St., Terre Haute, Ind.
Beta Mu	Univ. of Wyoming	Douglas R. Johnson	Office of Registrar, Univ. of Wyo., Laramie, Wyo.
Beta Nu	Univ. of Mississippi	William M. Carter	Box 844, University, Miss.
Beta Xi	Univ. of Florida	James L. Wattenbarger	Col. of Ed., Univ. of Fla., Gainesville, Fla.
Beta Omicron	Utah St. Agri. Col.	Eldon Drake	Utah St. Agri. Col., Logan, Utah.
Beta Pi	Ball St. Tchrs. Col.	Charles Marcus	Ball St. Tchrs. Col., Muncie, Ind.
Beta Rho	Univ. of New Mexico	Hal Dobkins	Rm. 17, Hodgin Hall, Col. of Ed., Univ. of N. Mex., Albuquerque, N. Mex.
Beta Sigma	Brigham Young Univ.	Percy Burrup	Brigham Young Univ., Provo, Utah
Beta Tau	Univ. of Hawaii	Ed Ouchi	813 Kapahulu Ave., Honolulu, T. H.
Beta Upsilon	Univ. of South Dakota	Thomas R. Risk	Univ. Exch., Univ. of S. D., Vermillion, S. D.
Beta Phi	Univ. of Connecticut	Stuart H. Manning	U-56, Univ. of Conn., Storrs, Conn.
Beta Chi	Col. of the Pacific	Kenneth Stocking	1821 Princeton, Stockton, Calif.
Beta Psi	Bradley Univ.	Larry Norton	104 Heading Ct., Peoria, Ill.
Beta Omega	Univ. of Idaho	Harold J. Soeters	904 West A St., Moscow, Idaho
Gamma Alpha	Univ. of Arkansas	Bernard Hanavan	203 Louise St., Fayetteville, Ark.
Gamma Beta	Univ. of Houston	Neal Adams	Box 565, Univ. of Houston, Houston, Tex.
Gamma Gamma	Mississippi So. Col.	N. L. Landskov	Miss. So. Col., Hattiesburg, Miss.
Gamma Delta	Arizona St. Col. at Tempe	Richard P. Nortman	Rt. 1, Box 72, Tempe, Ariz.
Gamma Epsilon	San Diego St. Col.	Frank Loveland Cole	4510 Harbinson Ave., La Mesa, Calif.
Gamma Zeta	Montana St. Univ.	Richard Keefe	1010 Cleveland, Missoula, Mont.

Field Chapters

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Alpha	San Francisco, Calif.	Arthur Lindborg	3766 21st St., San Francisco 14, Calif.
Beta	St. Louis, Mo.	L. H. Dickroeger	6232 Northwood Ave., St. Louis 5, Mo.
Gamma	Topeka, Kans.	Algot E. Anderson	522 Taylor St., Topeka, Kans.
Delta	Fresno, Calif.	George Warner	2515 Michigan, Fresno, Calif.
Epsilon	Los Angeles, Calif.	Edward W. Morton	2126 S. Bently Ave., Los Angeles 25, Calif.
Zeta	Detroit, Mich.	J. Edgar Bigelow	Bd. of Ed., Dearborn, Mich.
Eta	Santa Barbara, Calif.	A. A. Herman	Dist. Supt. of Schls., Nordhoff Union Elem. Schls., Ojai, Calif.
Theta	Kansas City, Mo.	Richard A. Ball	4312 W. 53 Terrace, Kansas City, Kans.
Mu	Muncie, Ind.	John Baker	Ball St. Tchrs. Col., Muncie, Ind.
Nu	Chicago, Ill.	Reino M. Takala	232 N. Elmwood Ave., Oak Park, Ill.
Xi	Sacramento, Calif.	Fred L. Griffin	Univ. Farm, Col. of Agri., Davis, Calif.
Omicron	Kirksville, Mo.	C. H. Allen	St. Tchrs. Col., Kirksville, Mo.
Pi	San Antonio, Tex.	P. Y. Gilbreath	119 Hoover Ave., San Antonio, Tex.
Rho	Pittsburg, Kans.	O. F. Grubbs	801 E. Quincy, Pittsburg, Kans.
Sigma	Portland, Ore.	Miller Nicholson	2345 N. E. 26th Ave., Portland 12, Ore.
Tau	Ogden, Utah.	T. O. Smith	Supt., Ogden Pub. Schls., Ogden, Utah
Upsilon	Milwaukee, Wis.	Oliver Wergin	2162 N. 53rd St., Milwaukee 8, Wis.
Phi	Tulsa, Okla.	Ted C. Anderson	1344 S. Indianapolis, Tulsa, Okla.
Psi	Omaha, Nebr.	Paul T. Thompson	3502 Grand Ave., Omaha, Nebr.
Omega	San Diego, Calif.	J. Edwin Eagle	4121 Fairmont, San Diego, Calif.
Alpha Alpha	Houston, Tex.	Milo E. Kearney	Univ. of Houston, Houston 4, Tex.
Alpha Beta	Tacoma, Wash.	Frank W. O'Neel	2204 N. Cedar St., Tacoma 7, Wash.
Alpha Gamma	Grand Rapids, Mich.	William T. Kutsche	726 Morris Ave. S. E., Grand Rapids, Mich.
Alpha Delta	South Bend, Ind.	Duewaine Hawblitzel	420 E. Ireland Rd., South Bend, Ind.
Alpha Epsilon	Hammond, Ind.	Frank S. Albright	717 Buchanan, Gary, Ind.
Alpha Zeta	Evansville, Ind.	Albert Longbrake	3310 E. Chandler Ave., Evansville 14, Ind.
Alpha Eta	Indianapolis, Ind.	Paul L. Carmichael	525 N. Riley, Indianapolis, Ind.
Alpha Theta	Bloomington, Ill.	Lewis Toll	Illinois St. Normal Univ., Normal, Ill.
Alpha Iota	Jackson, Miss.	Howard J. Cleland	Bailey Jr. H. S., Jackson, Miss.
Alpha Kappa	Appleton, Wis.	Edward Ehlert	1115 N. 18th St., Manitowoc, Wis.
Alpha Lambda	Fort Wayne, Ind.	Richard H. Shriner	3124 S. Harrison St., Fort Wayne, Ind.
Alpha Mu	Lafayette, Ind.	Leonard Smith	224 Northwestern Ave., W. Lafayette, Ind.
Alpha Nu	Toledo, Ohio	Daniel J. Crowley	Bowling Green St. Univ., Bowling Green, Ohio
Alpha Xi	Des Moines, Ia.	W. C. Findley	629 Third St., Des Moines 9, Ia.
Alpha Omicron	Charleston, Ill.	H. J. Arnold	Eastern Ill. St. Col., Charleston, Ill.
Alpha Pi	Macomb, Ill.	Ogden L. Glasow	316 W. Washington, Macomb, Ill.
Alpha Rho	Bakersfield, Calif.	Gerald Hedden	4519 Randy Ave., Bakersfield, Calif.
Alpha Sigma	Phoenix, Ariz.	Cecil McGirr	Rt. 1, Box 7, Scottsdale, Ariz.
Alpha Tau	Salem, Ore.	James Curtin	Henry Hill Sch., Independence, Ore.
Alpha Upsilon	Cape Girardeau, Mo.	Burwell Fox	Southeast Mo. St. Col., Cape Girardeau, Mo.
Alpha Phi	Cedar Falls, Ia.	Herbert Silvey	Bur. of Res., Ia. St. Tchrs. Col., Cedar Falls, Ia.
Alpha Chi	Santa Ana, Calif.	Joseph Hamblet	521 Riverside Ave., Newport Beach, Calif.
Alpha Psi	Utica, N. Y.	Roy L. Mitchell	1613 St. Jane Ave., Utica, N. Y.
Alpha Omega	San Jose, Calif.	William Rogers	c/o San Jose St. Col., San Jose, Calif.
Beta Alpha	Mobile, Ala.	R. L. Booker	1158 Gorgas St., Mobile, Ala.
Beta Beta	Springfield, Mo.	A. J. McDonald	935 S. Delaware St., Springfield, Mo.
Beta Gamma	San Luis Obispo, Calif.	A. G. Wilson	1343 Higuera St., San Luis Obispo, Calif.
Beta Delta	Pasadena, Calif.	Harley Lyon	95 N. Sierra Bonita Ave., Pasadena 4, Calif.
Beta Epsilon	Spokane, Wash.	Clarence Miller	Lewis & Clark H. S., Spokane, Wash.
Beta Zeta	Chico, Calif.	Joseph L. Slack	Chico St. Col., Chico, Calif.
Beta Eta	Garden City, N. Y.	Robert C. Stevenson	30 Surrey Dr., Merrick, N. Y.
Beta Theta	Tulare, Calif.	Ken Meeks	2020 N. Douty, Hanford, Calif.
Beta Iota	Ashland, Ore.	DeVere O. Taylor	1011 Winchester Ave., Medford, Ore.
Beta Kappa	Long Beach, Calif.	Bruce E. Strem	1106 S. Hill Ave., E. Los Angeles 22, Calif.
Beta Lambda	Lafayette, La.	George M. Armstrong, Jr.	110 Crestmont St., Lafayette, La.
Beta Mu	St. Cloud, Minn.	Ronald Riggs	St. Tchrs. Col., St. Cloud, Minn.
Beta Nu	Edinboro, Pa.	Walter A. Jameson	3723 French St., Erie, Pa.
Beta Xi	Redlands, Calif.	Eli R. Steed	409 E. Frederick St., Barstow, Calif.

District Organization

DISTRICT I

Representative: Victor N. Phelps, 2865 Harrison St., Milwaukie, Ore.

Coordinators: Homer Boroughs, Jr., 230 Education Hall, Univ. of Wash., Seattle 5, Wash.; Alvin V. Miller, So. Oregon Col., Ashland, Ore.

DISTRICT II

Representative: John C. Whinnery, 824 N. Greenwood Ave., Montebello, Calif.

Coordinators: Arthur E. Arnesen, 440 E. First South St., Salt Lake City 2, Utah; W. M. Gates, Phoenix Union H. S., Phoenix, Ariz.; Verne Hall, Jr., 825 Canada Rd., Woodside, Calif.; Arthur T. Tait, 3746 Lankershim Blvd., Los Angeles 28, Calif.

DISTRICT III

Representative: Ernest M. Anderson, Kans. St. Tchrs. Col., Pittsburg, Kans.

Coordinators: Ernest E. Bayles, Dept. of Ed., Univ. of Kans., Lawrence, Kans.; Clifford S. Blackburn, Supt. of Schools, North Little Rock, Ark.; M. R. Chauncey, Okla. A & M Col., Stillwater, Okla.; Paul Kantz, Texas Educational Agency, Austin, Tex.; Robert E. Strickler, 3538 Halliday, St. Louis 18, Mo.

DISTRICT IV

Representative: Maynard R. Bemis, Col. of Ed., Univ. of Wyo., Laramie, Wyo.

Coordinators: F. R. Adams, St. Dept. of Ed., St. Paul 1, Minn.; J. Leonard Davies, Col. of Ed., Univ. of Iowa, Iowa City, Ia.; Russell E. Jonas, Black Hills Tchrs. Col., Spearfish, S. D.; Herbert A. Smith, Tchrs. Col., Univ. of Nebr., Lincoln 8, Nebr.

DISTRICT V

Representative: J. Roy Leevy, Purdue Univ., Lafayette, Ind.

Coordinators: Edward C. Cieslak, 15414 Greenlawn, Detroit 21, Mich.; E. O. May, 28 E. Jackson Blvd., Chicago 4, Ill.; Russel S. Merkel, 521 S. Sherman Dr., Indianapolis, Ind.; Richard A. Siggelkow, 220 N. Murray St., Madison, Wis.; Walter Zaugg, Dept. of Ed., Bowling Green St. Univ., Bowling Green, Ohio.

DISTRICT VI

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Coordinators: Ernest R. Caverly, Supt. of Schools, Brookline, Mass.; Carolus T. Clark, 336 Mountain Ave., Westfield, N. J.; Donald C. Hennick, 4323 Rowalt Dr., College Park, Md.; Robert O. Shaffer, N. Y. St. Col. for Tchrs., Oswego, N. Y.; W. Clinton Stuart, 75 Sylvan Place, Valley Stream, L. I., N. Y.

DISTRICT VII

Representative: Charles R. Foster, Dir. of Grad. Studies in Ed., Univ. of Fla., Gainesville, Fla.

Coordinators: Rex L. Burrow, Rosedale, Miss.; John A. Dotson, Col. of Ed., Univ. of Ga., Athens, Ga.; Robert M. Fink, 410 North St., Chapel Hill, N. C.; Henry Goff, A. S. Rhodes Elem. School, Riverton, Va.; Clifton Hall, George Peabody Col. for Tchrs., Nashville 5, Tenn.; W. A. Lawrence, Louisiana St. Univ., Baton Rouge, La.; Leslie Martin, Univ. of Ky., Lexington, Ky.; Vincent McGuire, Col. of Ed., Univ. of Fla., Gainesville, Fla.; Gladstone Yeuell, Univ. of Ala., University, Ala.